

# ARCHAEOLOGY



Winter 1950

VOLUME 3 NUMBER 4

\$1.25

---

*Two Outstanding Books on Archaeology . . .*

## **EL KURRU** **ROYAL CEMETERIES OF KUSH**

*Volume I: by DOWS DUNHAM*

**T**HE FIRST in a series of definitive reports on the excavations of the royal cemeteries at El Kurru, Barkal, Nuri, and Meroë, this volume makes available for the first time the concrete new material and archaeological evidence found by the Harvard University-Boston Museum of Fine Arts Egyptian Expedition in 1918-1919.

The excavation at El Kurru, a site in the Egyptian Sudan, covers the first ten generations, including five generations of ancestors, most of the Kings of the Egyptian XXVth Dynasty, their wives, and even their chariot horses. The later sites treated are the burial places of their descendants who ruled over the land of Kush, first from Napata and later from Meroë. 73 plates, and 151 line cuts, 2 full-page charts, 2 maps, 2 halftones.

\$25.00

## **A History of the Giza Necropolis**

*Volume I: by GEORGE ANDREW REISNER*

**T**HIS authoritative report on original research contains source material essential to all Egyptologists. It is the first of two volumes constituting the definitive report on excavations carried out almost continuously in the great Giza Necropolis from 1902 until 1939. This first volume is devoted to a history of the site: to the chronological sequence of its many tombs, and to a study of the changes in style of construction, arrangement, and decoration. 75 pages of excellent colotype plates, 325 figures in text, 6 maps.

\$35.00

*At all bookstores, or*



**HARVARD UNIVERSITY PRESS**

Cambridge 38, Massachusetts

---

# ARCHAEOLOGY

A MAGAZINE DEALING WITH THE ANTIQUITY OF THE WORLD  
PUBLISHED QUARTERLY BY THE ARCHAEOLOGICAL INSTITUTE OF AMERICA

VOLUME 3, NUMBER 4 (12)

DECEMBER, 1950

## EDITOR

JOTHAM JOHNSON

## ASSOCIATE EDITORS

GLANVILLE DOWNEY  
CASPER J. KRAEMER, JR.  
J. ALDEN MASON  
GEORGE E. MYLONAS (*Book Reviews*)  
DOREEN CANADAY SPITZER

## EDITORIAL ADVISORY BOARD

JAMES H. BREASTED, JR.  
WALLACE E. CALDWELL  
KENNETH J. CONANT  
STERLING DOW  
PRENTICE DUELL  
CHARLES F. EDSON  
HUGH HENCKEN  
DOROTHY K. HILL  
KATHARINE JOHNSON  
SYDNEY P. NOE  
ARTHUR STANLEY RIGGS  
ROBERT L. SCRANTON  
EUGENE VANDERPOOL

## EDITORIAL ASSISTANT

GEORGE YANITELLI

## CIRCULATION MANAGER

LIONEL CASSON

## EDITORIAL AND BUSINESS OFFICES:

ARCHAEOLOGY,  
100 WASHINGTON SQUARE,  
NEW YORK 3, N. Y.

## Winter 1950

A Hathor from Eleventh-Dynasty Egypt, by WINIFRED NEEDLER .....	194
The Excavations at Yassihuyuk-Gordion, 1950, by RODNEY S. YOUNG .....	196
Truth Before Beauty, or, the Incomplete Photographer, by ALISON FRANTZ .....	202
Plastic Art on a Maya Palace, by LINTON SATTERTHWAITE .....	215
The Acropolis by Floodlamp .....	223
Moravian Buildings in Bethlehem, by JOSEPH A. MAURER and HANS-KARL SCHUCHARD .....	226
Skeletons, by J. LAWRENCE ANGEL .....	233
The Symbolism of Christianity, by MARGARET A. ALEXANDER .....	242
Middle-Kingdom Egypt, by DOROTHY KENT HILL .....	248
Archaeological News .....	249
Brief Notices of Recent Books .....	252
New Books .....	255
Table of Contents of Volume 3 .....	256

ARCHAEOLOGY is indexed in the ART INDEX



ARCHAEOLOGY is published in March, June, September, and December by the ARCHAEOLOGICAL INSTITUTE OF AMERICA, Andover Hall, Cambridge 38, Massachusetts.

Subscription, \$5.00 per volume in the United States. Foreign postage, \$0.50 additional. Single numbers, \$1.25.

Copyright 1950 by the ARCHAEOLOGICAL INSTITUTE OF AMERICA. All rights reserved.

Printed by The Vermont Printing Company, Brattleboro, Vermont.

# A HATHOR FROM ELEVENTH-DYNASTY EGYPT

By Winifred Needler

*Deputy Keeper, Near Eastern department, Royal Ontario Museum of Archaeology, Toronto, Canada*

THE MORTUARY TEMPLE OF NEB-HEPET-RE Mentu-hotpe, who re-united Egypt in the twenty-first century B.C., was decorated with unusually fine wall sculpture. Most of this sculpture has been destroyed by war and pillage during the past three thousand years. The block described below is one of the notable survivors.

The lady shown in our piece is recognized as the goddess Hathor by the headdress consisting of her divine attributes: the cow's horns and solar disk. She wears a white form-fitting garment of woven linen (originally reaching to her ankles) and an overdress of blue and red beadwork with jewelled shoulder straps and border band. Around her neck is a wide bead collar and on her bare arms are link bracelets, containing precious stones. In her left hand she carries the *was* sceptre, symbol of good fortune. At the upper edge of the block is preserved part of a sky border, once filled with yellow stars. Below this are two human heads, hieroglyphs surviving from a lost inscription which read from the damaged portion to the right.

The sculpture is in low relief with delicate surface modelling. It was painted in vivid colours which have softened during the centuries but which have kept much of their original brilliance. The height of the whole piece is about 21 inches. This is the original height of the limestone masonry block and its original

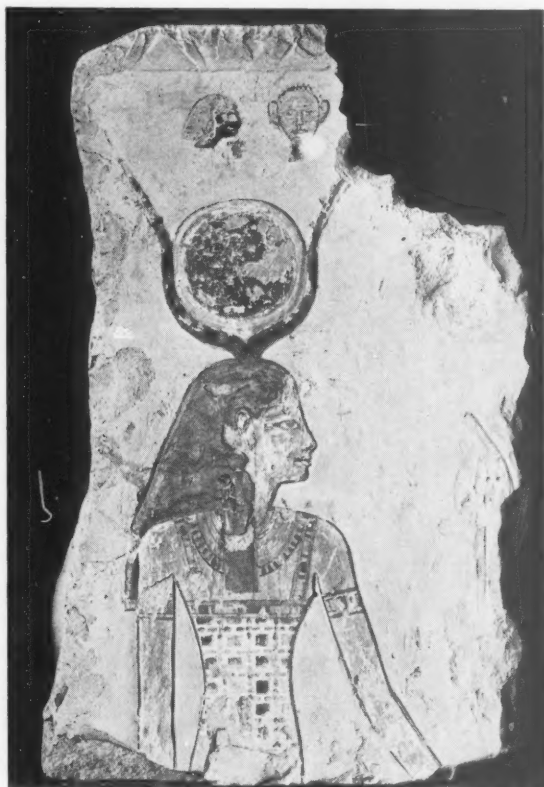
width is seen at the lower edge. The Hathor belongs to the Royal Ontario Museum in Toronto; it is mentioned in NAVILLE's *XIth Dynasty Temple*, Vol. I, but not illustrated, and its locality in the temple is not given.

Neb-hepet-Re's mortuary temple at Deir el-Bahari is now in ruins. Ancient records show that it was kept in

repair for at least one thousand years, but almost nothing of its beautifully sculptured walls remains on the spot today. Many museums in Europe and America possess fragments from it, most of them no larger than this Hathor. In America the Metropolitan Museum in New York and the Royal Ontario Museum in Toronto each possesses more than seventy pieces and the Boston Museum of Fine Arts a few. In Europe there are many in the British Museum and in the Geneva and Brussels Museums. Among these widely scattered fragments there is a great variety of subjects.

To what extent can we reconstruct the architectural setting of the fragments and determine their original place in a decorative and pictorial scheme?

The temple, designed for the ritual of the king's tomb cut deep into the western cliffs directly behind it, was a terraced building adorned with colonnades. A solid pyramid was set in the centre of a pillared hall on the upper level. Behind and in a recess cut into the cliff is a peristyle court (from which descends the passage to the tomb) and a second hypostyle hall with a rock-cut statue niche at its



*R.O.M.A. photo*



inner end. This western court and hall, unlike the rest of the temple, had sandstone walls, but within the hall a screen of limestone masonry formed a shrine, containing an altar, in front of the niche.

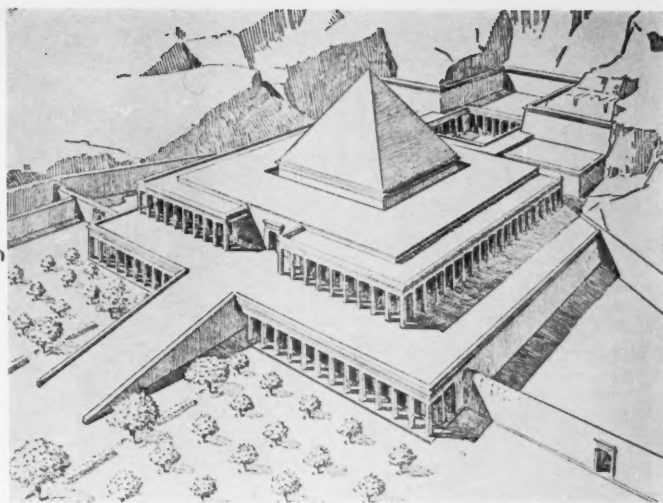
The perspective drawing shown here is mostly based on the restoration published by NAVILLE, who excavated the temple between 1903 and 1907. The Metropolitan Museum expedition under WINLOCK subsequently revised some of the inferences of the original excavators but in general agreed with their findings. The Metropolitan Museum excavators were able to add the grove of tamarisks and sycamore-figs seen in the foreground (described by D. B. THOMPSON in *ARCHAEOLOGY* 3.103-4). This temple inspired, more than

600 years later, the larger and more beautiful terraced temple of Hatshepsut immediately to its north.

The scattered fragments of wall sculpture from Neb-hepet-Re's temple show that traditional subjects of the Old Kingdom were used, with some innovations in detail and style.

The location of the comparatively few fragments recorded by the excavators and a general description of their finds show that the colonnades in the central and eastern parts of the temple sheltered wall sculptures in which the figures were mostly human, such as battle and hunting scenes, agricultural activities, processions of dignitaries and offerers, and the slaughter of sacrificial animals. The sculptures from the sandstone walls of the western peristyle court and hypostyle hall, like the columns and architraves throughout the temple, are easily distinguished from the rest of the sculptures by the difference of material. The sculptures from the limestone shrines of six princesses of the king's household, who were buried on the spot before the temple was planned in its final form, are also easily identified by their deep-cut, distinctive style. The finest wall sculpture of the temple, however, was on the limestone walls of the sanctuary in the western hypostyle hall. Here the king was pictured repeatedly in the presence of the gods, most frequently with Hathor, although Amun and others were also present. Comparison of our Hathor with fragments reported to have come from this room make it seem likely that she belonged to the sanctuary.

Had Hathor any special right to such prominence in the temple dedicated to the cult of Neb-hepet-Re? She



E. BALDWIN SMITH, *Egyptian Architecture*, Pl. 27

was a very ancient sky goddess, worshipped chiefly in Upper Egypt and associated with the sun-god Horus, and she was a goddess of love and joy; strange as it may seem, she became the protector of cemeteries as well. By the beginning of the Eighteenth Dynasty the locality of Deir el-Bahari in the Theban necropolis had become especially sacred to her and she was worshipped there in her cow form, attracting vast crowds of pilgrims. But no Middle Kingdom Hathor shrine is known at Deir el-Bahari. It is possible that her importance in this temple resulted from the king's special interest in her and initiated her association with the locality.

Neb-hepet-Re's Hathor did not have to yield her place of honour to a powerful state god. The cult of Amun, although known in Thebes at the beginning of the Eleventh Dynasty, was not especially important until the beginning of the Theban Twelfth Dynasty, when for the first time Amun became official patron of the ruling family. Neb-hepet-Re, Theban uniter of Egypt and therefore indirectly connected with Amun's rise to power, had no special interest in that god. He honoured Hathor at other places as well as at Deir el-Bahari. Remains have been found of a temple which he built for her worship at Gebelein, only nine miles upstream from Thebes. Gebelein had been sacred to Hathor since the beginning of Egyptian history. At Denderah, another ancient centre of Hathor worship, his name has also been found.

In her queenly dignity and grace our Hathor is a fitting patron of this great king who styled himself "Uniter of the Two Lands."



THE SITE AT YASSIHUYUK-GORDION AS SEEN FROM THE AIR

Fig. 1. The city mound appears at the lower left, beside the Sangarios River; on it may be seen three of the trenches cut in 1950. Of the two smaller settlement mounds one lies at the left, above the island in the river, the other to the right, separated from the main mound by a flat area now traversed by an irrigation ditch. At the center appears the modern village on the end of a spur of higher ground.

Most of the grave tumuli lie on the same spur; the biggest, at right center, is about fifty meters high and dominates the landscape. The tumuli dug in 1900 and 1950 lie on the nearer slope of the spur; they may be recognized by the trenches cut in them.

*Born in 1907 at Bernardsville, New Jersey, Rodney Young graduated from Princeton University (A.B., 1929), Columbia University (A.M., 1932), and Princeton again (Ph.D., 1940). From 1933 to 1940 and from 1945 to 1949 he was an Agora Fellow at Athens. When the war reached Greece he drove an ambulance until he was severely wounded. After his recovery he went to work for the O.S.S. in Washington and Cairo, and then for U.N.R.R.A. He is now chairman of the department of classical archaeology at the University of Pennsylvania, curator of the Mediterranean section of the University Museum, and field director of the museum's expedition to Turkey.*

# THE EXCAVATIONS AT YASSIHUYUK-GORDION, 1950

By Rodney S. Young

**A** LITTLE-KNOWN FIELD OF ARCHAEOLOGICAL RESEARCH was opened during the four months' campaign of excavation at Yassihuyuk-Gordion in Turkey, seventy miles southwest of Ankara, by the expedition of the University of Pennsylvania Museum in the spring and summer of 1950. Although no positive proof has yet been found that this site is Gordion, the ancient capital of Phrygia, it fills the two known topographical requirements of the Gordion site: it lies on the Sangarios River, and it lies on the military route from the west coast to the interior of Anatolia. It was at Gordion that Alexander the Great, advancing into the interior during his war with the Persian king, created a proverb by cutting the Gordian knot.

The Yassihuyuk site (FIGURES 1 AND 2) comprises a large habitation mound, the largest in the region, with two smaller mounds nearby, and nearly eighty grave tumuli (FIGURE 3), some of them truly regal in their proportions.

It is hoped that excavation on this site may suggest answers to many of the unsolved problems concerning the Phrygian people: their origin, the date of their appearance in Asia Minor, their relations with a waning Hittite Empire, and later, their relations with Greek culture in its formative stages. It is traditional that they made important contributions to Greece in the fields of religion and music. Little is known about what further contributions they may have made, or whether such contributions were original with the Phrygians or merely transmissions from the Hittite culture which had gone before.

The results of a first exploratory campaign can hardly be expected to answer any of

these problems; but the findings of the 1950 season indicate that whether or not the Yassihuyuk site is Gordion, it is an important Phrygian settlement, and that some of the answers are to be found here if they are to be found by excavation anywhere.

Four trenches were cut in the large city mound, one of which was a deep sounding carried down sixteen meters to water level. Six main habitation levels were noted. The lowermost layer produced Early Bronze Age pottery, proving that the site was inhabited as early as the third millennium before Christ. Above lay a layer containing late Hittite pottery and a section of wall crudely built of boulders and sundried bricks, evidently a part of a house or building of late Hittite times. The enormous chronological gap between the first and second layers may possibly be filled later by the finding of intermediate layers in

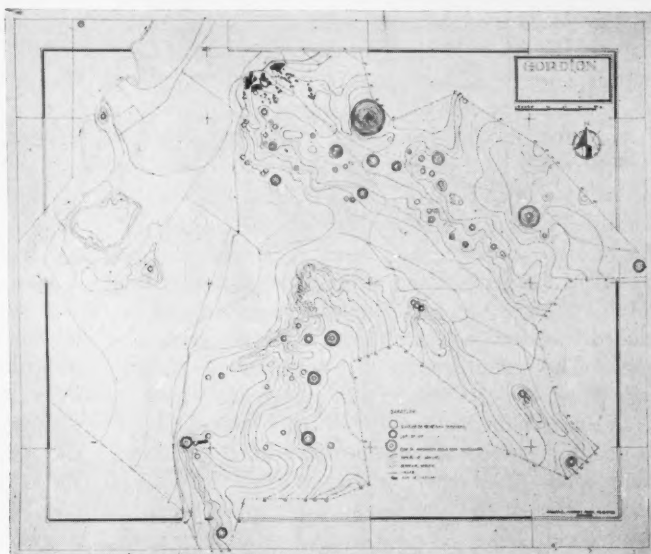


Fig. 2. Yassihuyuk-Gordion. Topographical survey of the site. The city mound lies to the left, with the smaller settlements above and below to the right. The tumuli dug in 1950 lie immediately to the south of the modern village, top center. Grave tumuli occupy two spurs of higher ground which run down toward the river from the hills at the east; at the north (above) there is a third spur which does not appear on our plan, and on which there are several more grave tumuli. Altogether there are about eighty such grave mounds on the site.



Fig. 3. Yassihuyuk-Gordion. View toward the east, showing the great tumulus (left) which is about fifty meters high. At the extreme right appear two more tumuli of moderate size; between these and the great tumulus (above the modern sheepfold) appears the largest of the tumuli, No. 3, which was dug by the Austrians in 1900. Many hundreds of tons of earth went into the building of these tumuli, and the labor of many people; one must assume that they cover the graves of important persons.

other parts of this large and significant mound.

The third layer contained sherds of characteristic but decadent Hittite wares, together with the grey pottery which is considered characteristic of the Phrygians, and which makes its appearance for the first time at this level. The second and third layers together suggest that the site will demonstrate the transition from Hittite to Phrygian.

The fourth level contained part of a large building of later Phrygian times. The stone socles for walls of sun-dried bricks are preserved to their full height, and the carefully laid floor of pebbles in clay was covered by bricks fallen from the walls. The pottery at this level was largely of grey Phrygian ware, but also included fragments of vases painted with geometric designs. The indications are that the buildings of this later Phrygian level will be well preserved.

In contrast, the buildings of the fifth level had been thoroughly plundered in Hellenistic times. Massive foundations of roughly squared blocks (FIGURE 4) occupy most of the eastern and southeastern areas of the mound. These foundations all follow the same

orientation and indicate that in archaic times this part of the city was occupied by a group of important public buildings. Many fragments of terracotta tiles, decorated with brightly painted relief figures, were found. One series of these shows Theseus killing the Minotaur; the tiles must have been used to decorate the facades of the buildings. Foundations of two large buildings have thus far been uncovered; further excavation may yield complete building plans. Near the edge of the mound the foundation of a wall 3.50 m. thick was uncovered, perhaps a section of a fortification encircling the settlement.

All these foundations are probably to be dated in the sixth century; the fifth level has been tentatively dubbed the "period of the Persian Empire." Over most of the mound it was covered by a thick deposit of Hellenistic times, mostly of the fourth and third centuries and containing the remains of private houses. The apparent abandonment of large areas of the city, late in the third century or early in the second, may have been due to the invasion of the Galatian barbarians who ravaged western Anatolia at that time. In

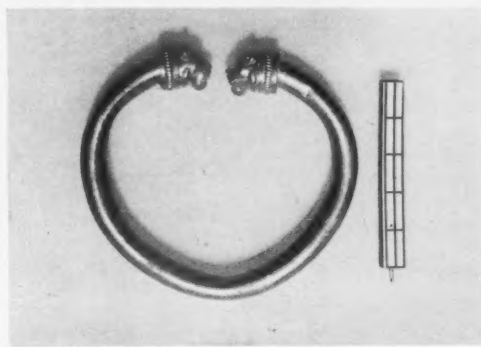


any case, later settlement seems to have been confined to the southern and southwestern edge of the mound, where remains of a settlement of early imperial times were uncovered, confirming the statement of the Greek geographer Strabo that in his times Gordion had shrunk to a mere hamlet.

Of the nearly eighty tumuli or grave mounds on the site five were dug by the Austrians in 1900, and six more by ourselves in 1950. All the graves dug so far belong to the eighth, seventh, and sixth centuries, and were apparently part of the necropolis of the fourth and fifth cities. One tumulus dug in 1950 covered the remains of a cremation of the sixth century, rich in gold and electrum jewellery (FIGURES 5 AND 6). Two more contained typical Phrygian burials probably of the seventh century (FIGURES 7 TO 10). Another covered a similar burial, poorly preserved. Yet another contained the skeletons of five adults and nine infants, suggesting that on occasion tumuli were erected over groups of pre-



Fig. 4. Foundations of a building of the fifth or archaic level on the city mound. The walls are built of roughly squared blocks of limestone laid in two parallel faces, with rubble filling between. These walls are 2.50 m. thick. They are bedded on a packing of rough stones, in many places traversed by great wooden beams laid through the thickness to serve as a binder. The building of which the foundations are shown stood at the edge of the mound; hence the settling of the wall, which now appears to run downhill. The opening of the joints between the blocks shows however that the wall was once horizontal and has settled.



Figs. 5 and 6. Jewellery from the remains of a cremation under one of the tumuli. After the body, evidently that of a young girl, had been burnt, the fragments of bone were gathered into a pit. The jewellery must have been thrown into the pit after the body had been cremated, as much of it was not damaged by fire. The bracelet of gold decorated with two lion's heads reminds us of similar archaic gold jewellery from Lydia. The pendants in the shape of acorns must have formed part of a necklace. Earrings, pendants of different form, and plain beads of gold and electrum which were found in the pit must also have served to adorn the maiden during her lifetime. Other objects found in this grave include a silver mirror, fragments of carved ivory, alabastra of alabaster, and a plastic vase in the form of a maiden holding a bird to her breast, probably imported from one of the Greek cities on the coast. The contents of the grave date it just before the middle of the sixth century B.C., and indicate that this must have been a period in Phrygia of great prosperity and with ample communications with the outer world.



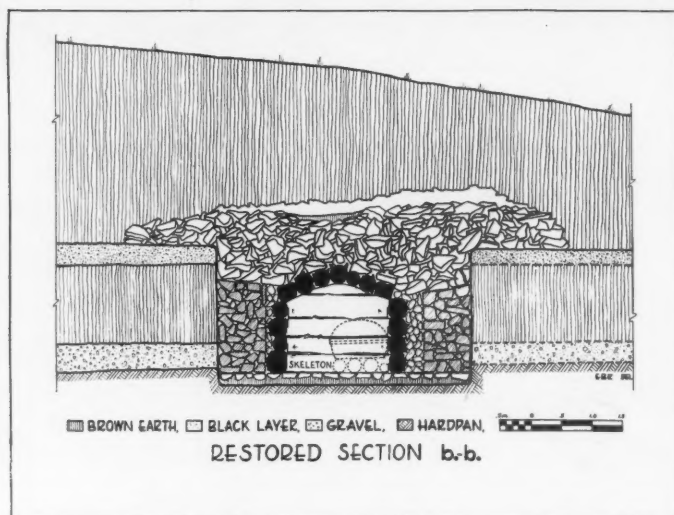


Fig. 7. Yassihuyuk-Gordion. A section of a typical Phrygian tumulus burial of the seventh century B.C. A deep rectangular pit was dug in the ground; then a chamber of wooden logs was constructed in it and floored with stone slabs. Next, the space between the outside of the wooden chamber and the sides of the pit was filled with stones. After the burial had been made, the chamber was roofed with logs and a great mass of large stones was heaped over it to a height of nearly two meters. Finally, earth was piled over all to make a conical tumulus or grave mound as a monument over the burial.

Fig. 8. The heap of stones over the burial. The position of the grave was betrayed by a hollow sinking near the center, where the weight of the stones had crushed in the wooden cover over the burial and the stones had settled.



existing graves, perhaps belonging to one family.

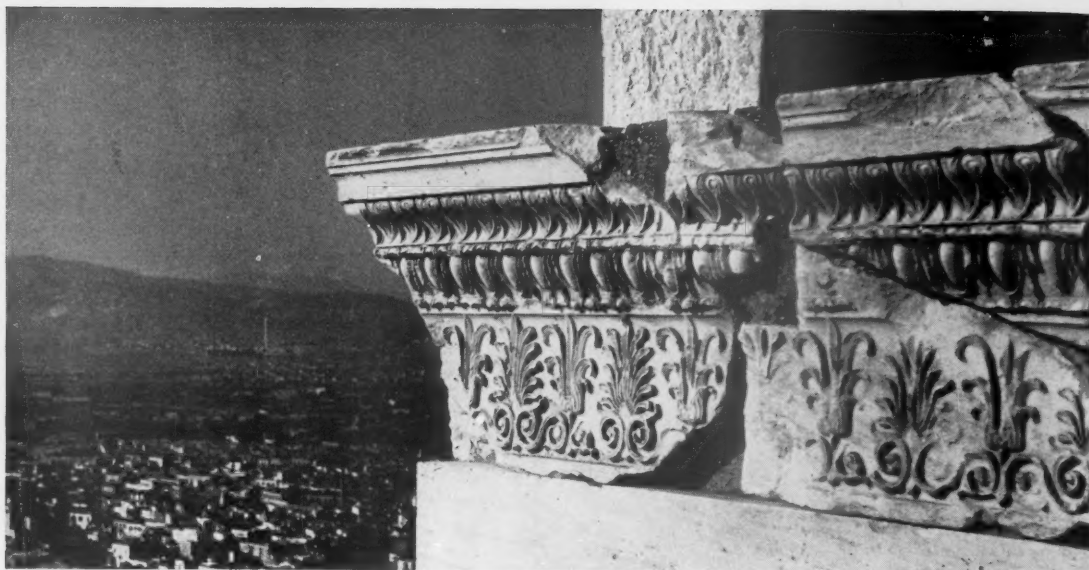
No burial has yet been found in the sixth tumulus, though the entire central area has been cleared to hardpan. Here, as in the case of the two Phrygian burials, the grave was evidently not at the center of the tumulus. If the grave in the greatest of the tumuli (FIGURES 1 TO 3) is likewise hidden away off-center, the technical problem of how to go about digging it in the future becomes formidable; perhaps the repose of the important personage who lies beneath will perforce remain undisturbed.



Fig. 9. The stones near the center of the heap where it had settled were removed, and under them was found the cover of wooden logs over the grave. Five of the seven logs which covered the chamber had broken under the weight of the stones.

Fig. 10. After the cover had been removed and the earth which had sifted in had been cleared away, the interior of the wooden chamber was revealed, constructed of large logs, rough-hewn but carefully mortised at the corners. The chamber contained two skeletons. One lay unprotected (left) on the stone floor; the other was enclosed in a large wooden coffin (right) inlaid with strips of lead. The grave offerings were plain undecorated pots, some placed in the coffin, others at the head and feet of the outside skeleton. Both bodies were evidently buried at the same time, since it would have been an immense labor to reopen the grave with its covering of stones beneath the tumulus to insert a second body, and no evidence was found to indicate that it had been reopened. We may therefore speculate as to whether the two people who died at the same time were victims of a plague, war, or famine, whether one had been sacrificed so that he might accompany the first to the other world, or whether we are to seek more romantic explanations.





Greek architectural ornament is best seen in the bright sunlight by both eye and camera

Exposure was made for the gleaming marble moulding of the Erechtheion, while the distant landscape was left to take care of itself. (50 millimeter lens on a Leica camera; photographed from the roof of the Porch of the Maidens.)

## TRUTH BEFORE BEAUTY OR, THE INCOMPLEAT PHOTOGRAPHER

By Alison Frantz

*Alison Frantz takes pictures for the Agora excavations of the American School of Classical Studies at Athens. Her photographs have illustrated many articles in ARCHAEOLOGY; here she speaks in her own name. Unless otherwise noted, the objects used as illustrations here come from the Agora collection.*

THE PICTURE-TAKING PUBLIC IN THE UNITED States has been estimated at about thirty million persons. Not a very select company, its members have only one thing in common: the habit of pointing a box with a lens at some object or scene which is thereupon memorialized on a piece of gelatine. The remarks on the following pages are addressed to one of the smallest groups of this great company: the archaeological photographers. Every group must have its subdivisions, so at the very outset we shall make a distinction as between the Excavation Photographer, or person who finds himself the official

photographer of an archaeological expedition, and the Archaeologist Who Takes Pictures.

Although the number of excavation photographers is small, few archaeologists can escape the necessity, at one time or another, of taking pictures of vases, inscriptions, or statues in small provincial museums, or sometimes even of holes in the ground. It is their misfortune that without special training they need to do work of the most exacting nature, usually without the possibility of returning for a retake if the first photograph is unsatisfactory. The excavation photographer is more likely to be stationary, has more equipment and

more control over conditions than his itinerant colleague, but he must also master a much wider range of material. The archaeologist who takes pictures usually has one specialty of his own and can learn his technique and choose his equipment for a limited field. The peculiar requirements of archaeological photography, however, are common to both categories.

Let us assume that the potential archaeological photographer, whether static or mobile, shares with the thirty million other American photographers an ability to make sharply focussed, properly exposed photographs of an ordinary scene in the sun or light shade. He perhaps started with a box brownie on his eighth birthday, graduated to a folding camera on his twelfth, and later made some recognizable close-ups of the family cat with the aid of a supplementary lens. With that as a starting point and any experience he may subsequently have acquired, he is ready to proceed to the use of a camera for specialized purposes.

**N**O MATTER WHAT the main objective of an excavation—whether it is the unearthing of treasure buried in ancient tombs or the uncovering of a city plan—both excavator and photographer must contend with that great category of objects known as Finds. This term usually applies to the things that find their way into an excavation house to be put through an elaborate process of describing, numbering, cataloguing and photographing before they are finally laid to rest on shelves and in publications. One



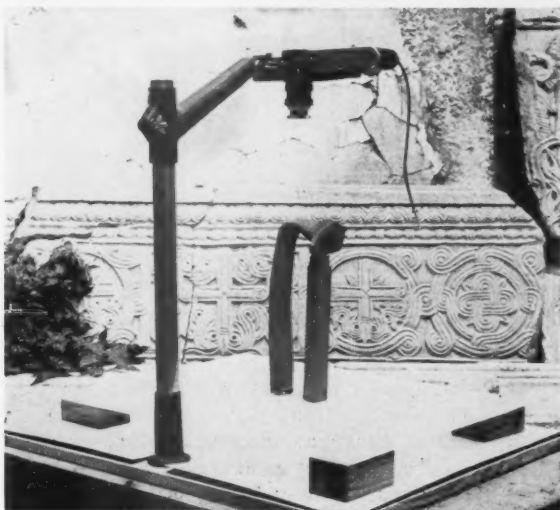
Picture set-up for small objects

The Leica with sliding focus on a copying stand and with ground glass as a background serves well for photographing most small objects. The Knidian lion (above) was taken in this set-up. Neither the long end of the jar handle nor the three props, two wooden and one plasticene, appears in the picture of the stamp.

of the chief problems besetting the excavation (or dirt) photographer is the fragmentary nature of such material. Ninety percent of the vases, terracottas and other objects on a town site will have lost their bases, their feet or their underpinnings generally, or, if something remains for them to stand on, are otherwise so fragmentary that their original outlines, when seen in two dimensions, are distorted or confused.

Here is a difficulty with which the Museum Photographer need not contend. Museums have a liking for whole vases; they rarely acquire objects which have no distinguishable top or bottom, or which, moreover, are without any discernible interest or attraction other than the historical. The archaeologist who takes pictures can likewise to some extent pick and choose. The excavation photographer, however, takes what he gets, and his business is to photograph what is left so that its relation to what was once there is clear. There are no angle shots, no outsize enlargements, no other aids to glamor in his daily routine. His duty is to present the truth, however unbeautiful, and, if possible, to present it in a comprehensible way.

The field photographer who spends months with an expedition in a remote spot is, furthermore, seriously hampered by absence of competition. A professional photographer in a large city either meets the artistic and technical standards of his competitors or else goes out of business. The field photographer may produce inferior work which is accepted for want of anything better, but when he gets home his pictures will be subjected to the most penetrating scrutiny of museum photographers, engravers, and interested





archaeologists. If the photographer's colleagues on an excavation are highly critical, he is indeed fortunate, although he may not think so at the time. But there are many otherwise expert people who cannot tell a good photograph from a bad one, or at any rate cannot tell why it is good or bad. It is then doubly the photographer's responsibility to produce a superior, not merely a passable, picture.

Every photographer of course develops his own methods, and the notes which follow make no claim to authority or even novelty. But the archaeologist who is about to take his first picture of a vase in a museum, or who finds himself designated as the photographer of his expedition, often discovers that it is quite a jump from his successes in the family album or even on the 16 mm. Kodachrome screen. To him, the following practical suggestions are offered.

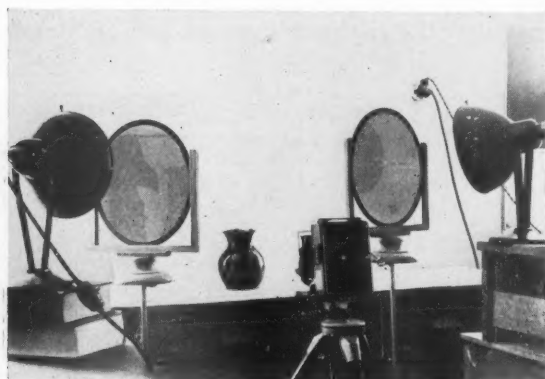
#### *Cameras, Lenses and Other Extravagances*

Every photographer knows that once he has acquired a camera he has started down the primrose path, a broad way lined on either side with displays of accessories, each one more alluring than the last. The archaeological photographer is just as susceptible to these temptations as anyone else, and with reason, for there is almost no limit to the equipment he may find useful. The excavation or personal budget, however, will probably exercise a restraining influence, so let us consider the basic essentials needed to provide a

photographic record and also pictures suitable for publication. Beyond this minimum, the photographer can proceed as the bank account permits.

Most important, naturally, is the choice of a camera, or cameras. There are many excellent cameras on the market; preference for a reflex, view, or miniature camera is to a great extent a matter of personal taste. The excavation photographer will soon find, however, that he is dealing with two different kinds of photography, one for identification and records, the other for publication. For the one, in my opinion, a miniature camera is essential, while for the other, in most cases, a view camera, 9 x 12 centimeters or larger, is preferable. In some cases enlargements from the 35 millimeter negatives will be suitable for publication. The 35 mm. is also widely used to record the day-to-day progress of excavation, and the increasing use of Kodachrome 2" x 2" slides is another factor in favor of choosing it. The Leica, with its great versatility, I have found ideally suited to these purposes. Small objects may be photographed at close range, either with one of a series of three supplementary lenses or with a sliding focus attachment. The sliding focus, which is the more satisfactory for most purposes, is a device which enables the picture to be composed and the lens focussed on ground glass. It eliminates measuring and in effect transforms the miniature camera into a view camera. When the picture is about to be taken the camera is slid along a track so that the film takes the place of the ground glass. Used alone, or with extension tubes of varying length, the camera can moreover take anything from a landscape to a coin at actual size, or a piece of ancient fabric magnified ten times. The sliding focus attachment not only saves much time in taking a run of routine pictures, but also is particularly useful for composing a picture or observing the effect of different lighting systems. Used simply as a hand camera, without sliding focus attachment, the Leica can often save the day when cramped quarters make it impossible to use a large camera and tripod.

For pictures taken specifically for publication a view camera is desirable. There is much disagreement as to the relative merits of the smaller, quarter-plate (4 x 5 inches) versus the half or full-plate camera (5 x 7 or 8 x 10 inches). Many photographers feel that there is nothing to equal the crisp definition of a contact print and therefore use an 8 x 10 inch camera. Others maintain that the projection (enlarging) process allows a control over the print which is not possible by contact. If a quarter-plate camera is chosen it must be remembered that most of the pictures taken for



**Polaroid set-up**

The view camera set up for a polarized picture, using the light from two 500-watt lamps directed through polaroid screens. Homemade stands take the place of commercial equipment. Continuous white cardboard forms an acceptable background for the red-figured vase as for any object that has a foot to stand on.

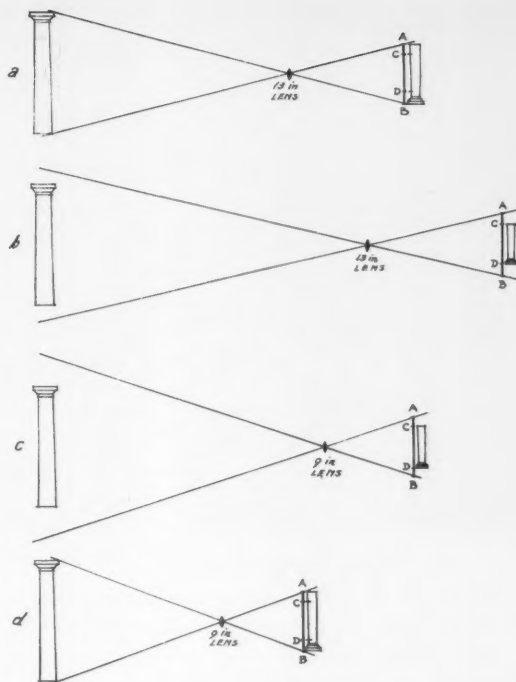


publication will be enlarged: their defects, as well as their virtues. There is inevitably a slight loss of definition in any enlargement, but present-day lenses for both cameras and enlargers make this almost negligible within the limits of enlargements likely to be used. The smaller view camera has the advantage of portability over its larger relatives and is more economical to operate.

The photographing archaeologist who does not want to invest in more than one camera will have to decide what features among those described above are most necessary for his own work. If he inclines to a larger negative size than the 35 mm., a twin-lens reflex will be a convenient camera for recording his travels and taking general pictures of an excavation; with supplementary proxar lenses it will enable him also to take small objects at close range. If, in addition to these requirements, he expects to do detailed work on an excavated site, he may prefer one of the good 35 mm. cameras with interchangeable lenses, so that he can work from any viewpoint and get the desired elements in his picture, whether in black and white or in color.

What the picture contains depends of course not on the size of the camera but on the lens used. It is not necessary to learn all about optics to be able to make a good picture but there are a few basic facts about the properties of lenses which it is essential to know, in connection both with buying and with using any camera. Lenses are described and identified by their focal lengths. The focal length, which is fixed for each lens, is approximately the distance between the lens and the image on the film when the lens is focussed on a distant point. Lenses of different focal lengths may be used on the same camera, and a lens of a given focal length may be used, within reason, on cameras of different sizes. For general use, however, a lens of focal length equal to or slightly greater than the diagonal of the picture area is customary. Therefore the larger the camera the greater the focal length of its normal lens.

The images projected on the film by lenses of the same focal length at a given distance from the object are the same size regardless of the size of the camera, and the image size increases with focal length. Therefore a larger camera will take in a greater field than a smaller camera equipped with the same lens. This may be understood better by looking at the diagrams (informal and non-mathematical) shown above. A-B, in *a*, represents the ground glass, or film plane of an 8 x 10 inch camera equipped with a 13-inch lens, placed in such a position that the subject, a column,

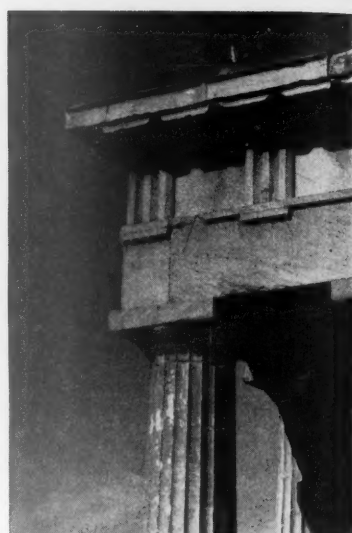


Focal lengths of lenses

What the camera sees through lenses of different focal lengths. In each diagram, A-B = the image projected on the film of an 8 x 10 inch camera, and C-D on a 5 x 7 inch camera in the same position.

occupies the full height of the film-field. If we decide to use a 5 x 7 inch camera, whose film plane is represented by C-D, with this same lens there will be no change in the angle at which the light rays enter the lens, nor in the distance from lens to image, since the focal length of the lens is an absolute, not a relative, measurement. Hence we merely have less of the column on the smaller plate. What is there will be at exactly the same scale as the image in the larger camera, but the top and the bottom of the column will be chopped off. If we want to use the 13-inch lens on the 5 x 7 inch camera (*b*) and get the whole column in the picture, it will be necessary to move the camera farther back, to a point at which the 8 x 10 would include much more of the surrounding landscape.

What then will happen when we put a 9-inch lens (*c*) on the 8 x 10 inch camera? If we place the camera at the same distance from the column as when it filled the field with the 13-inch lens, there is going to be a lot more in the picture than just the column; but put the same lens on the 5 x 7 inch camera and the



The southwest corner of the Hephaisteion, showing uses of wide angle, normal, and telephoto lenses

Interchangeable lenses are the equivalent of ladders and bridges. Here a corner of the Hephaisteion is photographed from the same point with 35 mm. (wide angle), 50 mm., and 135 mm. (telephoto) lenses on a Leica camera.

column will occupy the whole height of the field, because the image of the column is the same size, but the picture area is smaller. In other words, what is a normal lens for a 5 x 7 inch camera is a wide-angle lens for an 8 x 10, and a telephoto lens for a 35 mm. It will be seen, then, that whereas the focal length of a lens is absolute, the terms wide-angle and telephoto

are relative. Normal lenses for all cameras, from 35 mm. to 8 x 10 inch, are designed to cover approximately the same field from a given position; if a miniature camera with a 50 mm. lens and an 8 x 10 with a 13 inch lens are set up side by side, they will take almost the same picture, but one will be large, the other small.

The advantage of using a shorter focus lens than normal for a given camera (that is, a wide angle) lies in the fact that it is possible to get closer to the object and still have all of it in the picture. This fact is often of great value in excavation work, where deep pits, neighboring walls and other hazards may not provide room to move the camera far enough away to use the normal lens. When possible it is best to stick to the longer focus lens, as the greater distance gives better perspective.

Another optical fact which it is advisable to learn is the relation between the diaphragm opening and the focal length of a lens. There is no more frequent obsession in the mind of the non-photographing archaeologist than the idea that invariably the quality of the picture improves as the diaphragm opening decreases. Your colleagues will perhaps have watched someone with a full-plate camera sitting patiently beside his tripod while half an hour creeps by and a picture is finally made through the f64 opening. The picture is a success, so obviously the spectacular amount of time

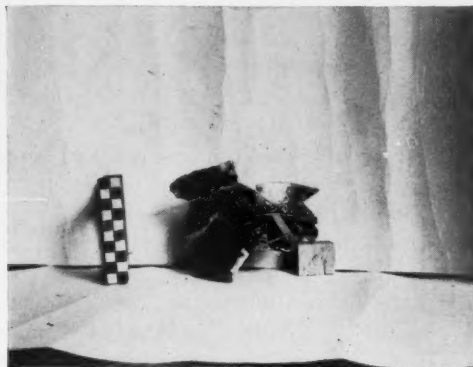


Depth of field with short-focus lens

Extreme depth of field is obtained with a 50 mm. lens stopped down to f22. The cat is 1.50 meters from the camera, the propylaia about 250 meters.

### How not to do it

The photographer's good intentions (below) are clear, but they cannot compensate for the dirty, crumpled background, distant view-point of camera, visible prop, incorrect angle of subject, dog-eared scale, and uneven lighting.



One way of doing it right

A straight unretouched enlargement (above) from a negative made with the same facilities as the picture on the left. Leica camera with sliding focus attachment in indoor daylight. The fragment was laid on ground glass and photographed from above. The old 10 centimeter scale was replaced by a clean 5 centimeter one, and a small reflector lightened a shadow caused by the rim.

required is responsible; surely the picture is twice, or four times as good as if it had been taken at  $f_{32}$ , and a camera with an  $f_{64}$  opening is therefore that much better than one not so equipped.

All photographers and many non-photographers know that the distance from the nearest point of sharp focus to the farthest point of sharp focus in a given subject, that is the depth of field, increases as the diaphragm opening becomes smaller. A considerable depth of field is usually desirable, and particularly when one is taking round objects at close range. What the indiscriminate champions of the small opening do not know, however, is the relation of the depth of field to the focal length of a lens. Whereas, as we have said, the depth of field increases as the diaphragm opening decreases, the depth decreases as the focal length of the lens increases. Hence large cameras having a normal lens of considerable focal length need lenses with smaller apertures to compensate for the loss of depth which would otherwise prevail. This is the reason why an 8 x 10 camera with a 13-inch lens needs an aperture of  $f_{64}$ , while  $f_{18}$  is sufficiently small to provide an equal or greater depth of field with the 50 mm. lens of a 35 mm. camera. The great depth of field, even at fairly large apertures, provided by miniature cameras with their short-focus lenses makes them very useful in excavation work where it is often necessary to cover a depth which could not be kept in focus with a large camera.

Once a decision about cameras and lenses has been

reached, the next purchase is a tripod. This is no place to practice economy. A flimsy job that sways in the wind and whose legs collapse without warning not only is an irritation but will result in wasted time and film and, worse, in the loss of a picture which perhaps cannot be retaken. A solid tripod with swivel top such as the Eastman Ciné-Kodak tripod will do admirably for both miniature and view cameras if the latter is no larger than 4 x 5; if it is 5 x 7 or larger a heavier tripod will probably be necessary. And before your bank balance is utterly depleted get a good photo-electric exposure meter. You may be able to guess exposures with reasonable accuracy outdoors in the sun or light shade, but what about indoors, and those shots looking down a deep well?

With regard to film, it is best to choose one kind and stick to it. I have found that Kodak Panatomic-X gives highly satisfactory results, due to its fine grain, good gradation and crisp definition, both for 35 mm. and for larger cut film. There are very few occasions where the extra speed of the faster film will be necessary. A yellow filter is desirable and there may be occasional use for a red or a green, but these last two are not essential.

The rest of the necessary equipment is inexpensive but important: ample supply of sheets of light cardboard at least 25 by 40 inches, with a smooth but not glossy white surface, for backgrounds; thumb tacks;

plasticene and pieces of wood of assorted sizes and shapes for propping; a sheet of ground glass about 20 by 30 in. as a background for objects photographed from above, and a number of 5 cm. scales drawn with india ink on heavy drawing paper.

Lighting equipment naturally depends on whether or not electricity is available. As a rule, only excavations in or near cities or expeditions substantially enough endowed to include generators in their equipment can count on it. Small museums rarely have adequate current or proper fixtures and it is best to assume that all photography in them will be by daylight. In case any high-powered electric equipment can be used the wiring should be checked to see if it will stand the anticipated load. (It is assumed that the voltage will already have been ascertained, and any necessary transformers acquired before leaving the United States.) Two 500-watt lamps in reflectors can be of great assistance, especially in photographing inscriptions or other objects needing strong cross-lighting. But whether or not electricity is at hand, there will be many cases where it is either impossible or undesirable to use it, so every excavation photographer needs a good mirror about 20 by 30 inches and a reflector made of a sheet of cardboard mounted on a light plywood frame and covered with tinfoil which has been crumpled and not completely smoothed out.

In the absence of electricity, or supplementary to it, flash may be found useful, but it will nearly always be necessary to have it on an extension, rather than at the camera. Those who are not accustomed to using flash, before investing in or using their equipment should read (and take along with them) some good book on

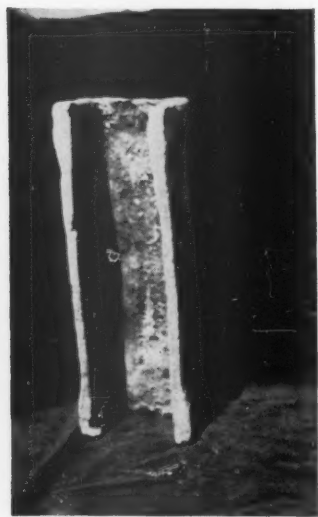
the subject such as *RUS ARNOLD'S Advanced Flash Photography* (which includes everything the beginner needs to know, too).

When all the equipment is assembled, the archaeological photographer of either category should check every item to be sure that it works; that the film holders and camera bellows are light-tight, that the screw of the tripod-head fits the camera, and that there are adequate supplies of film and all necessary processing chemicals. One otherwise well equipped and amply financed expedition recently found itself in the field with plenty of developer but no fixative. To avoid such misfortunes, it is well to have a list of the supplies checked by a reliable photographic dealer.

Finally, the photographer should no more consider setting forth without at least one or two general reference books than would the archaeologist. Three books which I constantly consult are the *Kodak Reference Handbook*, the *Leica Manual*, and the *Navy Training Course in Photography*, the last obtainable from the Superintendent of Documents, Washington, D.C. *The Manual of Photography*, and *Correct Exposure Simplified* which appeared as separate sections in the *Camera Magazine* for March and April, 1950, respectively, are excellent recent brief guides. It is worth remembering that photography is a far from static science; therefore there are always new developments to keep up with, both in equipment and in methods. A subscription to a periodical such as the *Camera Magazine* or *Popular Photography* will do much to counteract the isolation of the field photographer by offering articles on photographic processes, information on new products, and photographs against which he can measure his own technical standards.

#### *Prop Before You Snap: The Picture Set-Up*

Setting up the picture is the most time-consuming aspect of archaeological photography, whether on an excavation or in a museum. This may seem self-evident, from the nature of excavation material; yet, to judge from many pictures taken by photographers of a wide range of proficiency, it appears that the anxious archaeologist, intent on his subject (or on reading his new light meter), often pays very little attention to the look of his picture as a whole. If the beginner in close-up photography of objects asks what is the matter with his picture and why it looks unsuccessful and unprofessional, the answer is nearly always the same: he has neglected his set-up. Either he has put too many and unrelated objects in the picture, or the background is unconsidered and untidy, with the objects set at poor angles and the props visible, or, very likely,



#### **Dark laughter**

The black background may once have seemed convenient and inexpensive for large, light-colored objects, but the result is more than likely to be ridiculous. (Agora records picture, 1932)



### Brighten the corner where you are

Bright sunlight may be introduced into the murky recesses of a storeroom by the system shown in the diagram reproduced below. The arrow (right) indicates the whereabouts of the inscription (extreme right) when these pictures were taken.



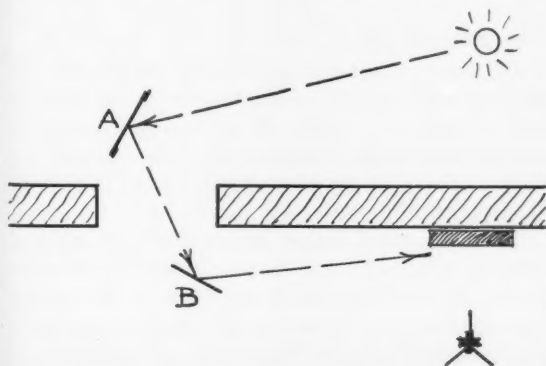
he has set the camera too far away from the subject. Any one of these recurrent tendencies can destroy the usefulness of a picture; to avoid them is well worth the extra time and trouble.

It usually seems desirable to keep the background for archaeological subjects a pure and untextured white. The photographer must always have an eye to the engraver, since he never knows what picture will be used for publication, and for technical reasons engravers dislike putting side by side a picture with a light background and one with a dark. Even apart from the preference of the engraver, a marked difference in the tone of the backgrounds of two or more pictures on the same page presents a distracting and spotty appearance and should be avoided. Moreover, the use of dark backgrounds gives an old fashioned and arty look which is out of keeping with the straightforward presentation which should be the aim of the archaeological photographer. A light-colored terracotta drain-pipe may stand out sharply against a piece of black velvet, but the two materials are incompatible, with the result that the drain-pipe looks either uncomfortable or pretentious. Care in lighting and processing will produce the desired contrast without recourse to dramatic effects. There may be occasions

when the only way to keep the background uniform is to darken it by keeping as much light from it as possible, as when an immovable object rests against a dirty or mottled wall, but such exceptions should be kept at a minimum.

For any object which preserves its original outlines, opaquing the background, that is, blocking it out completely on the negative with opaque paint so that it appears white on the print, is seriously frowned upon by archaeologists. The profile of the pot may tell its age to a decade; the line of the cheek of a sculptured head may reveal whether it is the work of a master or merely of a copyist. Therefore, no tampering is permitted, and the person using the photograph must be left in no doubt whether he is looking at the original outline or only an approximation of it. Negatives may be opaqued to eliminate shadows adjacent to broken edges, but it is a good general rule to try to compose and light a picture so that this will seldom be necessary.

First it must be determined whether the picture is to be taken from a horizontal position or looking down vertically. If a vase or piece of sculpture has its own foot or base, it should stand on it, on a table or on the floor, so that it may not appear to hang in mid-air. A fragmentary object, on the other hand, usually looks better if laid flat and photographed with the camera



### How to move the sun

The arrows show how the light of the sun was brought into the storeroom for the picture of the archaic inscription reproduced above (A, mirror; B, reflector).



looking down at it. Often that is the only position possible. In the first instance, if the size of the object permits, it is desirable to use one continuous piece of white cardboard for both background and foreground, thus avoiding a line of junction of a vertical and horizontal piece in the middle of the object. If a sufficiently large piece of cardboard is not available, great care should be taken to insure that the background line is quite straight, and occurs at a place in relation to the object where it will be least disturbing.

The photographer should always be equipped with enough cardboard so that he is not tempted to use a piece after it has become spotted and dirty. The camera is not selective, and if the picture is clear and sharp in other respects the spots will be clear and sharp too. Retouching, which requires skill and experience, is a tedious business at best, and no one in his right mind would commit himself to cleaning up the background on a negative, or to the expense involved by retouching at the engraver's when by putting a little extra care into his preparations for taking the picture he can avoid all necessity for retouching. For the archaeologist who takes pictures in various museums it may not be convenient to take along enough cardboard. For him an excellent substitute is a length of baby's rubber sheeting, which can be used over and over again, being washed between times with warm water and soap. It must not, however, be folded, as the creases will never come out, but it should be rolled around a stick and always carried that way.

For potsherds and small objects photographed from above, a sheet of ground glass raised two or three inches above a piece of white paper makes an excellent background, since it swallows up most of the shadows which would be troublesome on a piece of white cardboard. The glass should not be placed in a frame, but its corners should rest on pieces of wood in order to allow the maximum amount of light to enter the picture area. The natural light reflected from the paper is normally enough for this purpose, but it can be intensified by shining a beam from a strong electric light on the paper if circumstances demand it. This may be particularly desirable in the case of terracotta figurines and other low-contrast subjects.

It is obvious that a complete vase, statue or piece of sculpture must be straight in a picture and in a normal position, that is, right side up. It is equally true that fragments should be oriented according to their original shape and not their present one. The wheel-marks on the inside of a potsherd, for instance, are an infallible guide; if these are placed on axis it is certain that the figure or other decoration is at the

angle intended by the painter of the original vase.

Whether photographing from above or horizontally, the camera should be placed as near the subject as possible, while still leaving it room to breathe. There is no use in including a great expanse of background and then having to enlarge several times more than necessary in order to see the detail in the subject. But in moving in close, be sure that heads and feet are not cut off. This is a particular danger in the use of twin lens reflex cameras, where adjustment must be made for parallax at close range. The sliding focus attachment of the Leica and the ground glass of the view camera show the picture exactly as it will appear in the negative; the photographer equipped with these therefore has only himself to blame for clipped edges and off-center subjects.

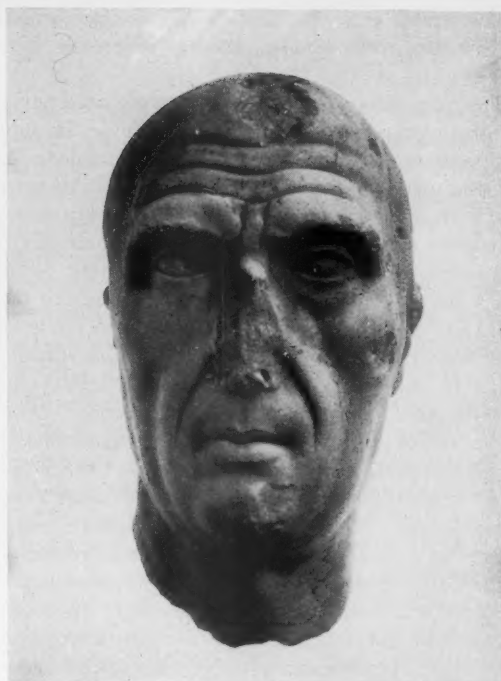
The fragmentary nature of most excavation material has already been mentioned, and this is responsible for much of the time consumed in preparing to take a picture. The curved piece of the body of a red-figured vase with the scene at the very edge, or the inscription broken at the bottom and back so that it tapers to a sharp point, cannot be photographed in the position in which they would naturally lie; but unsightly indeed is the picture in which the whole machinery of propping competes for attention with the subject. For small objects plasticene makes a convenient prop, but if it is used on ground glass a bottle of gasoline or household ammonia and a wad of cotton should be kept handy to clean the glass; otherwise an ugly grease spot will appear in the next picture. Plasticene marks on paper are less easily removed; therefore wood props are preferable wherever possible.

Many articles have been written about the photographic qualities of the human hand. The archaeological photographer should not, however, consider that these are addressed to him. If the nature of the subject makes it absolutely impossible to conceal the props let them at least be inanimate.

#### *Borrowing the Sun*

As noted above, the approach to the problem of lighting will naturally depend partly on whether or not electricity is available. In any circumstances it is assumed that a small museum or excavation will not be equipped with the elaborate apparatus of a New York commercial studio.

For most archaeological work I prefer daylight to artificial light; and to this the archaeological photographer is in any case generally restricted. In two special cases, however, good use may be made of electricity if it is available; that is, for objects demanding cross-



### Not all marble heads respond identically to identical treatment

The archaic head of Herakles appears well in direct sunlight, but the Roman portrait head responds to the system shown in the diagram re-

produced on page 212. (The foreground shadow which touched only the broken edge of the neck was blocked out on the negative.)

lighting, and for vases with a high polish to which polarized light is almost the only convenient answer. The principle in photographing inscriptions is naturally to place the light low enough so that the letters are filled with black shadows. It is usually most convenient to lay—or prop—the inscription face up (with the surface absolutely horizontal) and photograph it from above. One 500-watt light, moved around at a low angle, will determine how the letters will best stand out.

This is the main light and should not be so near the stone that it creates a "hot spot." A second light of the same strength, held at the opposite side from the first, is directed on the white background in such a way that it just touches the edge of the stone but does not counteract the effect of the main light. It serves to wash out the heavy shadow on the background, provided by the main light, which would otherwise be disturbing. The same principle may be applied to stamped inscriptions or patterns, and to materials of which it is desirable to reproduce the texture of the surface. If electricity is unavailable, flash,

either synchronized or open, may be used, following the same system. In this case a reflector, instead of a second flash, can serve to lighten the shadow, but some experimentation may be needed to keep the light from the reflector in the shadow area.

The problem of photographing a black-glazed or red-figured vase so that there are no objectionable highlights, and the outlines are crisp and black against the white background, has long been one of the most troublesome to archaeological photographers. Ordinary electric lighting is no use at all. In daylight the best results are obtained by cutting off as much light as possible from the sides, either by putting up screens or constructing a small tent, open only at the side toward the camera. Even so, the light reflected from the background and elsewhere may easily cause the outlines to trail off into an undefined mist so that the original shape of the vase is lost in the final photograph. A polaroid filter at the lens alone will not eliminate the highlights; polaroid screens must be used in front of the lights as well. These are rotated until the desired effect is gained. Complete polaroid equipment involves

a considerable extra financial investment but is well worth it for anyone who has dealings with many shiny pots.

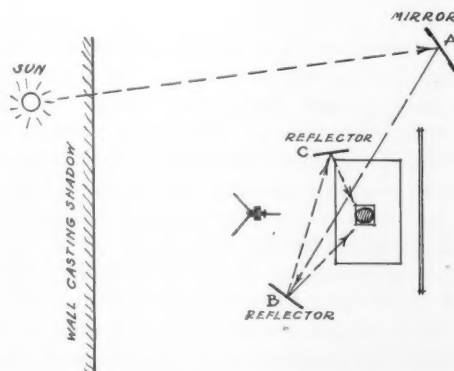
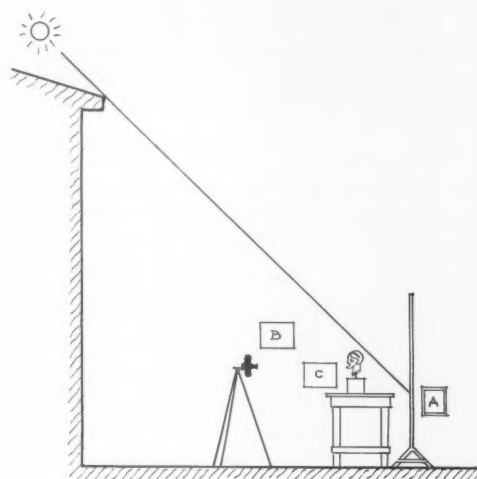
For many objects, e.g. vases that do not need polaroid, and especially groups of vases, diffused daylight in a room reasonably near a window, or outdoors in the open shade of a courtyard, gives an agreeable even light with a minimum of shadows. There are, however, many objects which cannot be moved about until they are in what is for them the best light. Some things are too big and others must be respected because they were found *in situ*. These seem rarely to have been placed with an eye to photographic requirements. In such cases, there is only one answer: to move the sun.

The use of mirrors and reflectors in outdoor excavation work is well known. It can be further applied to indoor photography. Perhaps the object to be photographed is a heavy inscription leaning against the wall of a dark storeroom in a provincial museum. As the visitor first looks into it the light seems hopeless. Even if it were coming from the right direction, it is not sufficient to penetrate as far as the inscription in question. Here the occasion calls for a mirror and a reflector: The mirror held outside the door where it can catch the sunlight and throw it to the reflector, which catches the beam from just inside the door. The reflector thus acts as the direct light source for the inscription, and the light comes from the side, as the nature of the subject demands (diagram, page 209).

These examples illustrate the possibility of using sunlight even when the sun is coming from the wrong direction. The same general principles may be applied to the photography of movable objects for which direct sunlight is too strong, diffused light too weak, and electricity either unavailable or unsatisfactory. A case in point is the photography of sculpture, especially heads. In preparing to photograph heads, it is well to follow the rules for basic lighting in portrait photography. That is, that the main light should be placed above and slightly to the front of the subject, so that the nose casts a triangular shadow on the cheek, while a weaker, or fill-in, light lessens the shadow from a lower point on the opposite side of the face to the main light. The excavation photographer may feel at a disadvantage because his subjects seldom have noses; he can, however, apply the principle. A portrait photographer normally uses electric lights whose position

he can control and whose intensity he can vary by the use of diffusion screens and other devices, so as to subdue too harsh highlights. But sculpture presents a problem in that marble reflects much more light than the human face, and under electricity tends to lose its modelling in a welter of highlights. Diffused daylight produces a rather flat and uninteresting picture, while direct sunlight makes too heavy shadows and too bright highlights. (An exception may be made in the case of Greek archaic sculpture, which, with its crisp transitions of facial planes, shallow-set eyes and absence of highly polished surfaces, responds well to direct sunlight.)

Here a solution may also be found in the use of mirrors and reflectors. The head to be photographed is set up on a table which is half in sun and half in shade, the head being on the shady side, the white background in the sun. One assistant a little to one side



#### Lighting scheme for photographing sculpture

Sunlight striking the mirror, A, is directed on the subject from the two reflectors, B and C.

of the table, in the sun, catches the sunlight from a low angle in a mirror and sends it back to another assistant who is holding a reflector in front of the subject from above, at approximately a 45° angle (diagrams, opposite). The reflector furnishes the main light and its position may be varied according to the effect desired. The fill-in light, from the opposite side, may be a smaller reflector held low near the chin, just outside the picture area. Usually the working distances will be so short that the photographer himself can hold this secondary, or tertiary, reflector, thus dispensing with the need of a third assistant. One advantage of the system described above is that the full sunlight on the background provides good separation from the subject, particularly desirable in photographs intended for reproduction.

### *You Do The Rest*

Ideally an excavation should be equipped so that all processing, both developing and printing, can be done on the spot under the supervision of the photographer. This is not often feasible, but at least it should be possible to do the developing, which requires much less space and equipment. It is also the most important step, since it is at this stage that a negative can be irrevocably ruined. Developing of 35 mm. film may be done with no darkroom installation, using only a changing bag and a daylight tank. This method is less satisfactory for larger sizes of film, and wherever possible a darkroom, however simple, but supplied with running water, is desirable. Aside from the advantage of being able to control development according to subject and circumstances, the desirability of seeing many negatives immediately, before the work of excavation progresses to the next stage, makes on-the-spot developing almost indispensable in field work.

To get the most out of his negatives, the photographer, whether the developing is done by him or by someone under his direction, must have some understanding of the properties of different developers. If he has never been in a darkroom before; if he has never known that anguished desire to turn on the light to find the sheet of panchromatic film he has dropped on the floor just as he was about to put it in the developer; or if he has never seen the first traces of a picture appear as a sheet of white paper is rocked in the developer, then he should run to the nearest person competent to guide him through the various stages of developing, printing and enlarging. For anyone seriously interested in taking up archaeological photography, a course in a good photographic school is an excellent investment. There are many of these

schools scattered throughout the country. My own alma mater, the New York Institute of Photography, provides in its commercial course a solid training in the basic elements, thereby enabling its graduates to follow out their own special fields of interest, wherever they may be. In any case, until he has a practical grasp of all the steps that go into making a good picture no one should attempt to qualify as an excavation photographer.

In recommending developers and developing times, the manufacturers of films necessarily have in mind the average outdoor scene; and for all photographs that fall in this category these recommendations should be followed. In most excavations, however, the subjects to be photographed will range in contrast from the extremes produced by white marble and black shadows in the midsummer Mediterranean sun to the dead flatness of a sand-colored potsherd. If negatives of these two subjects are processed in exactly the same way and the outdoor scene appears with a full gradation of tones, the potsherd will resemble a mud-turtle camouflaged on a mud bank. If the turtle is brought to life, the other picture will be nothing but a harsh admixture of chalky highlights and coal-black shadows. Since contrast increases as development is prolonged, the discrepancy may be remedied to some extent by varying the developing times. This is not always sufficient, however, and whereas a soft-working developer like Eastman D-76 produces an excellent range of tones in an outdoor scene, it may be too flat for low-contrast subjects taken in diffused light. In that case another developer must be chosen for the latter to give it the necessary snap.\* Because of these differing requirements cut film, which is more easily processed a few sheets at a time, is preferable to film-pack for the archaeological photographer's view camera; likewise, in using the 35 mm. camera, an effort may be made to plan the work so that outdoor scenes and details of objects need not appear on the same film. The proper uses of printing papers, the virtues of different types of enlargers and many other details may also be stud-

\* A recently perfected developer, Panthermic 777, is said to produce almost any degree of contrast desired, depending on time of development. It can also be used at any temperature between 60° and 90°, thus for the most part eliminating the necessity of either cooling or warming the developer, the hypo and the wash-water, a bugbear during a large part of the year. I have been unable as yet to try out the Panthermic 777 myself, but if it lives up to the manufacturer's claims it should be ideally suited to the demands of field work.



ied; for these LOOTENS' *On Photographic Enlarging and Print Quality* is an excellent guide.

### Color

The color transparency is today a necessary tool of archaeologists who are expected to present the results of their work in lectures. Apart from the fact that color film has much less latitude than black and white, thus demanding greater accuracy in exposure, outdoor shots, i.e., landscapes, progress of excavation, etc., are no more difficult to make than black and white; in fact they are often easier. Not so pictures of objects. In the first place, their colors will be judged more critically. In a landscape the sky may be a brighter shade of blue than normal; or reflection from a red truck may turn a white wall slightly pink, but as long as the general effect is pleasing and apparently undistorted, no one will complain, or take the transparency to match up the colors with the original scene. If, on the other hand, the scene on a red-figured vase takes on a bluish cast, the discrepancy will be immediately apparent and objectionable.

The production of consistently good transparencies of objects needs much experimentation under local conditions. The easiest method would be to use artificial light with Kodachrome A. But in the places where an archaeological photographer is likely to be functioning, the electric current, if any, usually fluctuates too much to be used with accuracy. Kodachrome A is balanced for a particular color-temperature, which is determined in part by the voltage of the line.† If the voltage falls, the color temperature changes and with it the colors of the transparency.

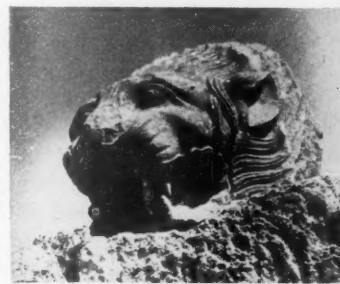
Artificial light being thus eliminated, faithful reproduction of colors is most easily obtained by using daylight-type Kodachrome in direct sunlight; with all but small objects, however, the elimination of shadows here presents too great a problem. These may be avoided by using diffused daylight, as with black and white film, but this often produces a bluish tinge because much of the light is reflected from the sky. With care, and much experiment, the excessive blueness may be corrected by using one of the Kodak color-compensating filters, which are furnished in varying degrees of strength, the CC 13, 14, and 15 covering most archaeological needs. To learn what to expect from these, it is a good idea to take nine pictures of

the same object, using three different exposures with each of the three filters. Regard one 36-exposure roll as purely experimental and treat four subjects of different types this way, keeping careful records of exposure, diaphragm openings, number of filter and lighting conditions for reference when the film is returned. The number of experimental exposures can be gradually decreased until finally the results may be predicted with some certainty.

THE FOREGOING SUGGESTIONS are intended only as a guide to some of the most common problems met with in archaeological photography. Every photographer will develop his own methods to suit his surroundings, his subject-matter, his equipment and his temperament. Since those for whom these hints are written were archaeologists before they became photographers, they already have one of the qualifications for success: an understanding of their material. But archaeological photography is not an independent science; it is based on general photographic principles and only the person who learns these principles will be equipped to deal with any specialized branch. The lion-keeper at the zoo may be able to induce his animals to adopt prize-winning poses, but unless he knows something about cameras, light, film, exposure, developing and printing, his way with lions will do him no good as a photographer. On the other hand, when he has mastered these technical requirements, he will have the edge on other would-be lion photographers.

But lion-taming can be anxious work. To spend week after week trying to present the truth in its unvarnished form, wrestling with uncooperative and unphotogenic objects, photographing a long stretch of mud-brick wall because it is Significant and a hole in the ground because it once contained Something, may leave the photographer with a poor sense of values. For him the best prescription is to take his camera out on a Sunday, and see if he can achieve the ambition of his thirty million brethren, namely, to make a Salon Print.

Olympia: a lion



† For the vagaries of color temperature and in fact for a comprehensive guide to all aspects of color photography the reader is referred to *Kodachrome and Ektachrome from all Angles*, by FRED BOND, Camera Craft Publishing Co., San Francisco 1947.



# PLASTIC ART ON A MAYA PALACE

By Linton Satterthwaite

*Mr. Satterthwaite is a native of Trenton, New Jersey. In 1920 he graduated from Yale University and went to work as a newspaper reporter. In 1923 he was admitted to the New Jersey bar and from 1924 to 1928 he practiced law. In 1929 he joined the University of Pennsylvania Museum. Since then he has done field work at a variety of sites in the United States and Central America, particularly at Piedras Negras, a fine Maya Old Empire site in Guatemala. In 1943 he received the Ph.D. degree in anthropology from the University of Pennsylvania. He is now associate curator of the American section of the University Museum and lecturer in anthropology at the University's graduate school.*

*He was in British Honduras on archaeological reconnaissance from March 10 to June 28, 1950; the pictorial report which follows covers a twelve-day sojourn at Benque Viejo, from June 3 to 14.*



The Maya countryside looked like this

A thousand years ago the Classical Maya Indians of Mexico and Central America were beginning to abandon the products of half a millennium of feverish building activity. The priestly upper caste had lost its command of peasant labor for the construction of architectural stage-settings for their countless rituals.

If ordinary life went on, hilly parts of the countryside looked like this. The house on the left is much like an ancient Maya dwelling. Then as now slash-and-burn farming for corn and beans kept the tropical rain-forest in check. Then as now, centered on the horizon from this point of view, rose the ruin of the highest building of a Maya ceremonial center. The present-day Maya of the neighborhood call the site *Xunan Tunich* ('Stone Lady'), but in the reports of travelers it is generally called *Benque Viejo*. The pictures which follow deal with this site and, for the most part, with this highest structure, a many-roomed "palace" near undoubted ruins of temples. We are in west-central British Honduras, a few miles from soldiery of Guatemala guarding the boundary between the two Central American countries.

### Mayas still hang on

From the ruins, the country looks like this. The foreground betrays my presence during a short stay in June, 1950, which ended a reconnaissance in British Honduras for the University of Pennsylvania Museum. The tripod "tower" is for photography. The tarpaulin is an Army-and-Navy-store one, and it leaked. The people are Maya who have come up, on a Sunday, to see what is going on. They don't erect elaborate ceremonial pyramids, platforms, and buildings any more, but they were curious to see an ancient facade, sculptured in stucco, which we were uncovering.



In terms of ancient geography we are in an eastern peripheral zone of the Classical Maya area. Here, it has been said, small and comparatively poor provincial communities produced only small sites and relatively low-grade artistic achievements. Benque Viejo is one of these small peripheral sites—"Class 4" in the scheme of the late great Mayanist SYLVANUS G. MORLEY. There are only six stone monuments, and of these four are plain—unsculptured but probably originally with painted designs.

In the photograph JACINTO CUNIL, Maya expert in things supernatural, farmer, and archaeological digger extraordinary, leans against Stela A1. We may continue to regard Benque Viejo as a provincial site, but the stucco-decorated facade which JACINTO helped to excavate may cause us to revise upward our notion of the cultural potentialities of even the provincial Classic Maya.

### Plain stela at a provincial site



As one may see here, JACINTO looks much like the priests carved on the ancient stelae. His inheritance is spiritual as well as physical. With him as foreman one does not merely dig. The ancients were forever burning copal incense in their temples; he burns it before a tiny Christian cross of split palm stems. He prays with unshakable faith to God and various saints, but also to the ancient Maya wind and rain gods who preceded them in this part of the world. Thus insured, we had no accidents, and the rains held off till the last three days of our twelve-day stay. Then the red, black, white, and yellow *Chacs* of the east, north, west, and south got busy. They had to maintain an average rainfall of 52 inches, whether archaeologists (and JACINTO) liked it or not.

Jacinto Cunil



### The mound on the platform

Benque Viejo was described by TEOBERT MALER in 1905. He made a plan of the palace-type building atop the highest mound, here seen from the south. The bush has just been cut by the government, which keeps the ruins cleared as a national reserve. The mound has been known as Structure A6 since A. LEDYARD SMITH mapped the site and J. ERIC S. THOMPSON dug out the ceramic sequence, both men working



for the Carnegie Institution of Washington in the 1930's. Since MALER's time it has been known that rooms, roofed with the all-masonry "Maya vault," occur on two levels. The lower ones were built first and I have called the construction of this period "Str. A6-2nd." Later components, partially burying it, are called "Str. A6-1st" since one comes on them first in digging. Building-supporting terrace "pyramids" of both periods rested on the large flat-topped platform in the foreground. It is the building of Str. A6-1st, on its pyramid, which we see high against the sky.

The late THOMAS GANN dug a number of pits at this site in 1924 and 1927 for the British Museum. He did not excavate at our mound, the east side of which is shown here, but he described it in a popular book. He reported that on this side "the lowest story has been elaborately carved," an observation which seems to have escaped notice since. This fact was rediscovered recently by A. HAMILTON ANDERSON, the government's District Commissioner and the outstanding amateur archaeologist of the colony. THOMPSON had put me in touch with him, and ANDERSON led me in person to just about everything I had come for. For good measure he showed me a small exposure of stucco sculpture indicated by the arrow in the photograph, below the floor-level of the latest building. He had dug just enough to show that ruined exposed portions could be followed to well-preserved designs below the sloping surface of the mound. He had correctly inferred that they pertained to the earlier building, Str. A6-2nd, though I did not think so at first.



The east side—sculpture!



**Astronomical glyphs—morning and evening star**

accidentally before the facade was buried since elsewhere there is much evidence that care was taken not to damage the old sculpture as concrete for the new pyramid was packed against it.

#### **Buried in ancient concrete—a God**

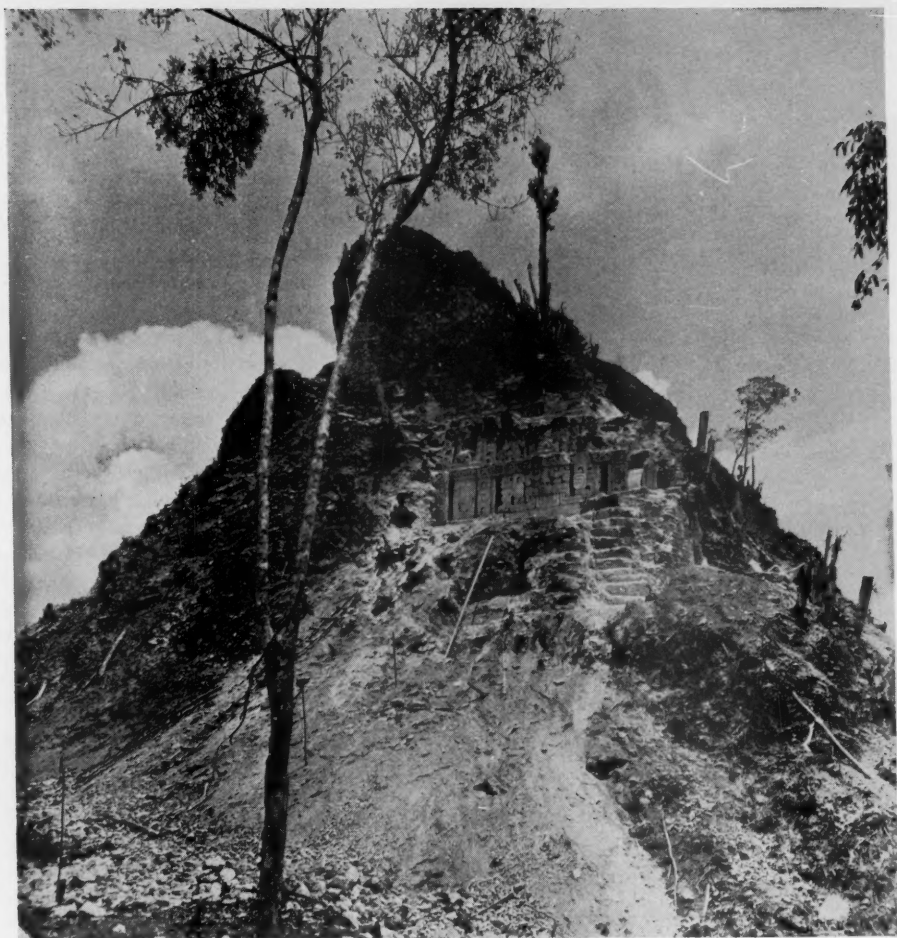
As excavation proceeded, two principal levels or bands of symbols and rectangular frames appeared. Each is about 1.36 meters (4.5 feet) high. Here a huge and monstrous deity mask is beginning to emerge in the lower band. We have reached the tip of his nose and the base of his left eye. Naturally, as we proceeded downward or inward from the corner of the ruined late pyramid, better preservation of the early sculpture was encountered. For scale, it should be noted that the marks on the rod give centimeters, not inches. Thirty of them make 0.98 foot.



What ANDERSON had discovered was a deep niche within a rectangular frame, completely dug out in this picture. When he first showed it to us three of the four repeated signs at left and top of the frame were already visible. They are repetitions of the Maya glyph for the planet Venus. It was obvious that the reference is to the 584-day cycle of four periods, during which Venus shifts from morning to evening star, with disappearances after each appearance. When a Mayanist finds art and architecture tied to astronomy he gets excited. Though only a few days would be available after making the planned reconnaissance elsewhere, with Mr. ANDERSON's help and approval government permission to investigate was obtained from Mr. E. D. HONE, Colonial Secretary. His Excellency The Governor, SIR RONALD H. GARVEY, Mr. HENRY MELHADO of Belize, Mr. A. F. MAPP, J. P., of El Cayo, and many others in and outside of government were also helpful in many ways. British Honduras is a nice, friendly place to work.

The headless bust before the niche was, I think, a secondary addition. The lower arms, now missing, evidently stood free. They were probably broken





Our cut completed, from base-level

The niche of the Venus glyphs and its secondary bust can be picked out on this general view of our completed excavation. They turned out to be parts of a very ambitious design. In the picture, our dump reaches down to base-level. Whatever shows between this and the bottom of the exposure of sculpture, and at higher levels to our left of it, pertains to the late Str. A6-1st. If we should dig inward through this sufficiently, we would see an earlier pyramid, probably of two terraces, rising 5.30 meters (17.4 feet). Well back from its top edge we would also see the plain base or plinth of the early building, 30 centimeters (0.98 feet) high. The lowest of the visible late steps is at the same level, but farther forward.

On the plinth, still hidden in our picture, were placed the plain vertical walls or "lower zone" of the early building, topped by a projecting cornice-like "medial molding." These add 3.30 meters (10.8 feet) of height and bring us to the base of the sculptured "upper zone," the north end of which has been uncovered. The modeled plaster rests on the molding and against the sloping exterior surface of vaulting which roofed the early rooms. The rooms themselves had been filled with lime-concrete hearting so that the early building, on this east side, was completely protected by a matrix of concrete, inside as well as outside. It was originally built for use in late Classic times, since its vault stones are large and beveled and its walls were faced with well-cut stone "veneers."



The god is over a doorway not dug out

Most, but not all, of the modeling is in bold but rather flat relief. The darkest shadows, best seen in the "straight-on" picture, were obtained by providing voids running clear back to the sloping structural upper zone behind the carving. In this view note that at the extreme left we exposed the beginning of the frame over the central doorway. Emphasis of the center was obtained by having this frame overhang slightly. The corresponding frame of the upper band contains sky glyphs. The symbol immediately to the observer's left of the excavated mask in the lower band is a gigantic Maya moon glyph, a stylized crescent.



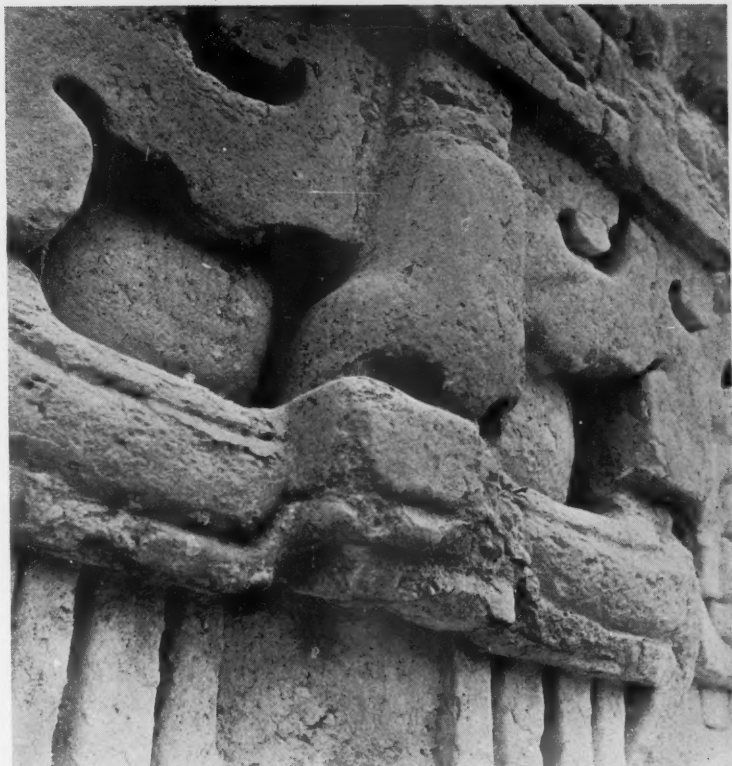
Close-up: voids to make shadows

In this straight-on view the camera looks up only slightly. The Maya themselves never saw their creation from so high a perch. If the man with the pick should keep going he would expose the upper half of the plain "lower zone." Most of the medial molding is visible, cracking at the center where it probably crosses a doorway. We believe our deity mask, here completely revealed, was centered above this doorway. To the left, still buried when we left, there must be two other masks above two other doorways. The entire upper zone on this east side measures about 19.50 meters (64 feet) in length, and the height of this mass of symbolic modeling, where complete, is about 3.10 meters (10.2 feet). Thus it ran to about 60 square meters or about 650 square feet, as seen in elevation.

Upper zones on the other three sides of the building were of similar dimensions and it is hard to believe they were not similarly decorated. If digging in their collapsed remains proves this to be the case, what we see here is only about one-twelfth of the original complete stucco unit, though it is about one-third of what has survived.

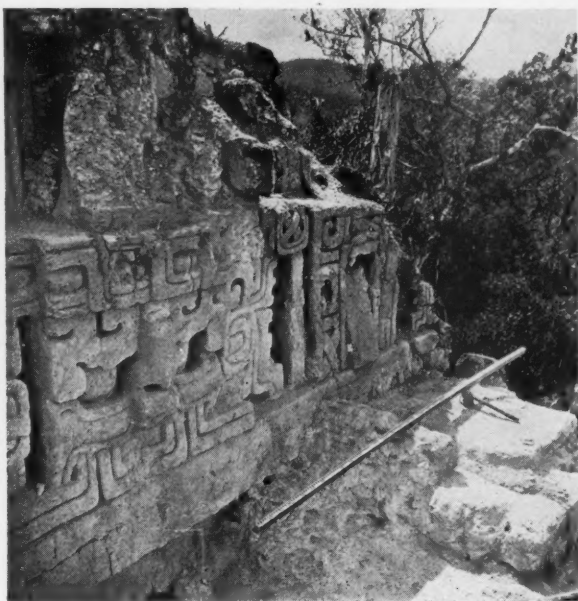
**Details of deity mask—  
eyes, nose, teeth**

Here one looks up and from the side at the eyes and nose of the god thus associated with the moon and, less directly, with the sky and the planet Venus. The upper lip projects outward at the center, and from this projection it is possible and perhaps probable that two human incisor teeth hung down, notched on the sides. The human nose is of a Roman type and the eye-sockets are more or less rectangular. All these features suggest the Maya sun god. However, the mouthful of enormous stylized fangs and the absence of a lower jaw suggest that this is too simple an interpretation.



**Set-back arrangement of upper band**

This view illustrates the fact that the upper of the two main bands is set back from the lower, in general conformity with the sloping structural surface behind both. In general, the related designs on each level are kept distinct, but above the mask they seem to have been bound more closely to each other. Here some sort of design rose from close to the front edge of the shallow "terrace" forming the top of the lower band, and was connected with a projection from the top of the upper band. Between these levels it stood free, and must have cast a strong shadow on the upper band running behind it. In the photograph the later concrete fill has been only partially removed from behind the rounded back of this complex. The front is destroyed, but possibly was a headdress of the god below.





Final band: a "gingerbread" man

The varied elements of the two main sculptured bands were also visually bound together, in a more general sense, by the plain medial molding on which they rest, and by a final comparatively simple low band which stood out against the sky at the top. The latter ran between plain masonry masses at either end. Below a plain molding forming its top, monotonously repeated supporting elements are shaped to give the space between them the forms of Greek crosses. Something of this band of "negative" Greek crosses can be made out at the top of this view. It is partly hidden by dark ruined masses projecting upward from the upper main band. These are above and to the observer's left of a "gingerbread" man. This sketchy figure is down on one knee, and seems to hold aloft a group of large glyphs. Their black color is due to moss and weathering, where exposure by erosion led Mr. ANDERSON to his discovery.

On behalf of the government and shortly after we left, Mr. ANDERSON placed a metal roof over the whole facade, so far as we had exposed it. Countless similar stucco-decorated buildings are evidenced further west by mere surviving remnants of the sculpture, but nothing else is now known which approaches this in size and degree of surviving completeness. It provides a very neat proof that the great masonry buildings were built for astronomer priests, but the size, elaborateness, and symbolic subject-matter argue against the common notion that "palace" buildings like this were priestly dwellings. One hopes that some time the whole structure can be laid bare. The writer, for one, would hate to see this done until resources are available to convert the mound into an *in situ* museum and thus provide indefinitely for its care and preservation.





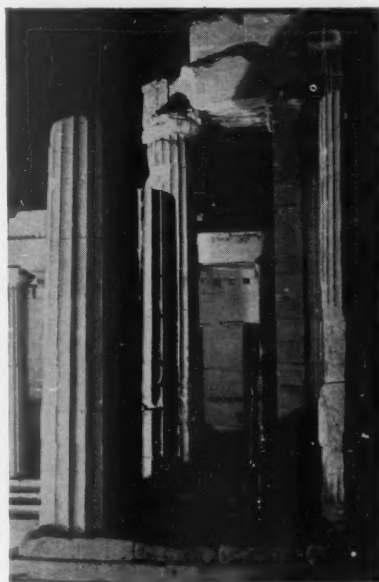
## ACROPOLIS BY FLOODLAMP

ONCE IN A WHILE, when circumstances favor, the Athenians, who are neither insensitive to the intellectual splendors which deck their skyline nor indifferent to the sweetnesses of discreet publicity, light up the Acropolis and its marble halls with powerful floodlamps and throw them open to the public gaze.

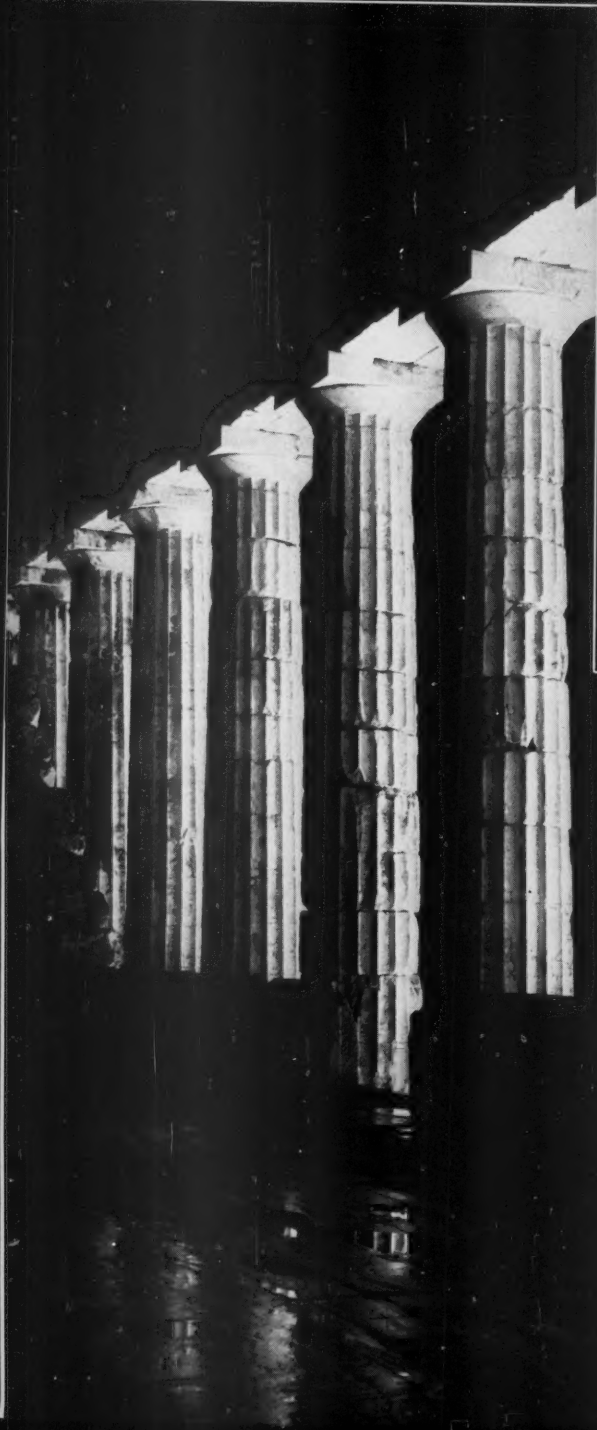
On one such occasion were taken the photographs which appear on this page and the next. It had been raining, so that the extraordinary impressions of the scene were further enhanced by reflections from glistening pavements and shallow pools.

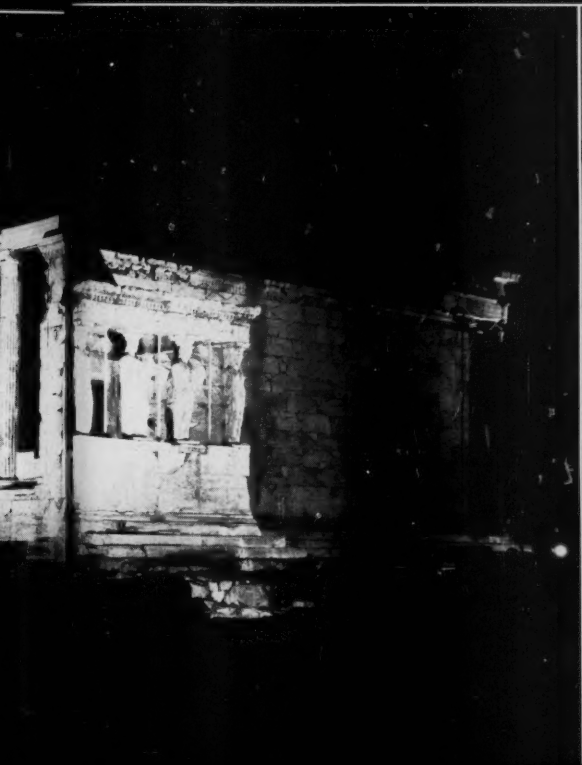
Above appears the Acropolis as seen, under such favorable conditions, from the Hill of the Muses. Left to right, the base of the Agrippa monument and the Propylaia, with the little temple of Athena Nike lost in the glare, the Erechtheum, and the Parthenon. The engraving at the right reproduces part of the west portico of the Propylaia, the monumental gateway to the Acropolis.

On the next page are four more night scenes, three of the Parthenon, one of the Erechtheum, showing these famous buildings as if in a new fourth dimension. *ARCHAEOLOGY* owes these unusual views to the courtesy of A. G. C. MAITLAND, assistant professor of Classics at New York University, who brought them back some years ago from a Mediterranean cruise.



# THE ACROPOLIS AT NIGHT





# MORAVIAN BUILDINGS IN BETHLEHEM

By Joseph A. Maurer and Hans-Karl Schuchard

Photographs by G. Wallace Driver, Jr.

*A detailed study of the buildings described here was made by the late Garth A. Howland, professor of Fine Arts at Lehigh University, Bethlehem, Pennsylvania, and published in Volume 13 of the Transactions of the Moravian Historical Society. Following a suggestion by Hugh Hencken, president of the Institute, Professor Howland agreed to prepare an article on this subject for ARCHAEOLOGY, but his illness and untimely death brought these plans to naught. The present article, based on his research, is dedicated by the authors to the memory of a colleague and friend.*

*The authors acknowledge the courtesy of the Directors of the Moravian Historical Society for permission to reproduce Figures 2 and 11 from Professor Howland's article, and of the Rt. Rev. Kenneth G. Hamilton, Ph.D. Assistant Archivist of the Moravian Church, who kindly read the article and gave us the benefit of his criticism.*

*Dr. Joseph A. Maurer is assistant professor of Classical languages, Dr. Hans-Karl Schuchard is assistant professor of German, and Mr. G. Wallace Driver, Jr., is assistant editor of publications, at Lehigh University.*

OF THE MANY SETTLEMENTS IN THE ORIGINAL Thirteen Colonies, Bethlehem in Pennsylvania, like Bethlehem in Judea, was not among the least. Founded in the year 1741 by a group of Moravians from Germany who were seeking an asylum in Penn's colony in the new world, the town received its name on Christmas Eve of that same year and became the center of an extraordinary evangelistic, missionary, and educational effort conducted among both the white settlers and the Indians.

To further this effort, the whole community was organized into what is known as the "General Economy." Only members of the Moravian Church were allowed to be permanent residents, and these were all grouped into choirs, i. e. divisions according to age, sex, and condition in life. There were choirs of married people, of widows, of widowers, of single brethren, of single sisters, of older boys, of older girls, and of children, each choir having its own house, worshipping apart except on Sundays and special days when all used to meet for common worship, and

carrying on its work under the supervision of choir-leaders who were responsible to the church authorities. Members received no financial remuneration.

In this way the total energies of the frontier community were devoted to a program of evangelization and education. Within twelve years of the founding of the community, some thirty-six professions and trades were being carried on at Bethlehem, the net profit of which financed the various activities of the Moravian Church in the new world. It must be borne in mind, however, that the communal life and industry of these early

Moravians in America arose from a fervent desire to foster their program of evangelization and education as expeditiously as possible and that to this end every member in the community had dedicated his life and work. The result was that within twenty years of the founding of Bethlehem and of Nazareth, another Moravian community established some nine miles to the north, some six hundred men, women and children were able to support fifty evangelists and ministers in

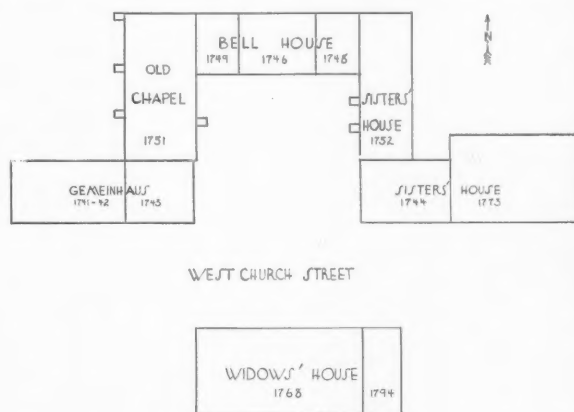


Fig. 1. Bethlehem, Pennsylvania. Ground plan of Moravian Buildings on West Church street.



their work of evangelization in Pennsylvania and neighboring colonies and in addition thereto could maintain fifteen schools at various places.

In the year 1762 the authorities dissolved the "General Economy" which had been introduced only as a temporary measure and which had served its intended purpose admirably. The choir system in its strictest form then began to yield to the more natural family life and by the middle of the nineteenth century it had become greatly modified. Bethlehem, however, continued as an exclusive Moravian village until

the year 1845, when it was opened to non-Moravians. Even thereafter it remained a small, tranquil community, retaining very much the spirit and ideals of the founding fathers and being known principally as the administrative center of the various Moravian enterprises in America. It was only in the second decade of the present century that the town began to experience the rapid growth which has been coincident with the expansion of the Bethlehem Steel Company during World War I and the years thereafter.

On West Church Street stand the buildings erected prior to the American Revolution which present a definitely Old World appearance and charm. They are solid, well-proportioned, and simple in their elegance—*simplex munditiis*. Their extent and size were not lost to visitors who fled here for refuge during the French and Indian Wars and some years later during the Revolutionary War. In fact, it was the commodiousness of these structures which led the

Continental Congress to make Bethlehem one of the hospital towns after WASHINGTON's army retreated across the Delaware River in the year 1776 and after

the battle of Brandywine Creek, when persons prominent in the cause of American independence visited the community. To discuss the visits of all who came and enjoyed the hospitality of the Moravians does not lie within the scope of this article, but it is of interest to note that among such visitors were WASHINGTON, BEN FRANKLIN, JOHN HANCOCK, the MARQUIS DE LAFAYETTE, CASIMIR PULASKI, ALEXANDER

HAMILTON, and HENRY LAURENS.

The ground plan (FIGURE 1) shows a group of contiguous buildings disposed about a small square and forming a quadrangle with the Widows' House across the street. The oldest of these buildings is the

Gemeinhaus "Community House" erected in the years 1741-1742 (FIGURE 2) and enlarged by an extension eastward in the year 1743, and it enjoys the distinction of being not only the oldest building still standing in Bethlehem but also the only log structure in the group. It was constructed of massive oaken logs on a rectangular ground plan of 94' x 32' (as enlarged), with three stories and a steeply pitched roof having a double set of dormer windows. It contained a chapel, twelve rooms, and two dormitories, the latter being on the third floor. Always primarily a residence, it is today an Old Folk's Home maintained by the King's Daughters' Union. The exterior was "modernized" in the year



Fig. 2. Bethlehem, Pennsylvania. Sketch of the Gemeinhaus as it probably appeared when first constructed and before it was enlarged. Drawn in accordance with ideas expressed by Garth A. Howland.



Fig. 3. Bethlehem, Pennsylvania. West Wall of the Old Chapel, showing the buttresses. The Gemeinhaus is seen in the rear.



Fig. 4. Bethlehem, Pennsylvania. Bell House and Bell House Square. On the far left, the Gemeinhaus covered with weather boards, and the Old Chapel adjoining. On the right, the west wall of the Sisters' House.



Fig. 5. Bethlehem, Pennsylvania. The Bell House cupola, with the original weather vane.

1868, when the log and mortar walls were covered with weather boarding. The upper set of dormers, which had served only for ventilation, was removed early in the present century because of bad leakage.

Extending north from the east end of the Gemeinhaus is the Old Chapel, a two story structure built in the year 1751 of local Potsdam sandstone. Measuring

66' x 32', it was designed to provide on the ground floor a dining hall for the Married People's Choir. The upper floor became the second place of worship, because the chapel in the Gemeinhaus could no longer adequately serve the growing community. Later, because of evidence of insecure rock foundation, it was necessary to reinforce the walls with tapering strip buttresses; three were placed against the west wall and one against the east (FIGURE 3). Further settling of the building necessitated additional safety measures. The heavy tiles were removed from the roof and replaced with shingles, and in the dining hall masonry walls were run crosswise. For more than fifty years the Old Chapel was the church in which the several Choirs worshipped together.

Before the end of the century, however, the continuing growth of the community required the erection of a new church which was completed in the year 1806 and is now known as the Central Moravian Church. The Old Chapel then served the community in various ways, being at times a concert hall, a place for storing the church archives, and a chapel for the girls' school. But in the middle of the nineteenth century its interior was radically altered and it received its present appearance. Since then it has been used as an auxiliary house of worship.

Adjoining the north end of the Old Chapel is



Fig. 6. Bethlehem, Pennsylvania. Sisters' House complex seen from the rear. On the left the east wing, in the middle the original unit of the complex, and on the right the northern extension.

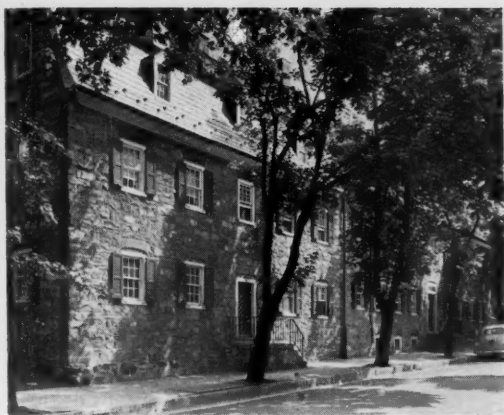


Fig. 7. Bethlehem, Pennsylvania. First unit of the Sisters' House complex, with east wing adjoining on the right. Note the difference in floor levels, and the absence of a cellar in the original unit.



Fig. 8. Bethlehem, Pennsylvania. Front view of the east wing of the Sisters' House.

the stone structure known virtually from the beginning as the Bell House (FIGURE 4). Originally it consisted only of the central portion of the present building, erected in the year 1746 and measuring 35' x 27', and was intended to provide living space for the growing choirs. Further accommodations required the enlargement of this structure, one wing being added on the east end in the year 1748 and the other on the west end in the year 1749. The Bell House with its cupola relieves the uniformity and solidity of these buildings and is the focal point of the whole group, overlooking, as it does, a small square. The cupola (FIGURE 5), rising on a square base and surrounded by an ornamental railing, is six-sided with plain, open arches on which rests a bell-shaped dome. Professor HOWLAND mentions that it is almost identical with the cupola over the "clockgate" at Hampton Palace, England. In the base a brass clock was installed. In the cupola itself were hung three bells which had been cast by SAMUEL POWELL, a member of the community who had learned his trade in England. Crowning the whole is the original weather vane with the emblem of the Moravian Church, the Lamb bearing a banner to which the word *Heyl*: "salvation" has been added. The clock has long since been moved to the belfry of the Central Moravian Church. The largest of POWELL's bells—it cracked early in the year 1776 and had to be recast—still hangs in the cupola of the Bell House where it is rung daily to summon the pupils of the Moravian Preparatory School.

The east end of the Bell House Square is formed by the Sisters' House, actually a complex of three buildings erected over a period of years extending from 1744 to 1773 (FIGURE 6). The first (FIGURE 7) of these was built in the year 1744 at the southeast corner of the Bell House Square and measured 40' x 30'. It was planned as the house of the Single Brethren's



Fig. 9. Bethlehem, Pennsylvania. Colonial Hall of Moravian Seminary and College of Women. The belvedere is unique among Moravian buildings.

Choir but it was to remain theirs for only four years, because the rapid growth of this choir led the authorities to plan a larger home for it. In the year 1748 the Single Sisters' Choir took possession of the house and it remained their home. But the Sisters' Choir also grew in numbers, so that by the year 1752 the structure had to be enlarged by an annex which was built and extended northwards to meet the east wing of the Bell House, thus completing the square. Here, as in the case of the Old Chapel, weakness of the foundation rock prompted the masons to erect two strip buttresses against the west wall. This annex contained a dining hall on the ground floor, a chapel for the Choir's own use on the second floor, and a dormitory on the third. Within a score of years, however, the Sisters agitated for additional space and a large structure adjoining the original enlarged one was erected to the east and completed in the year 1773 (FIGURE 8). Though conforming in general style to the two former sections, this last is an entirely new building and, unlike them, has a full basement and higher floor levels. The basement was used for the various tasks connected with the household, the first and second floors were divided into large rooms where the sisters practiced their hand work, painting, and music. The third floor contained the Schlafzimmer "sleeping-hall." Today this house, too, is an apartment house for women of the Church.



Fig. 10. Bethlehem, Pennsylvania. (Above) Widows' House. Note the similarity of this building to the east wing of the Sisters' House.

Fig. 11. (Below) Buildings of the Moravian settlement at Neuwied-am-Rhein. These were the prototype of the Moravian buildings in Bethlehem. Note how similar the facade is to that of the first unit of the Sisters' House complex, Figure 7.

Church Street boasts two other eighteenth century buildings which, however, are not part of the group on the north side of the street. The older of these is the stone structure erected in the year 1748 as the new and larger house of the Single Brethren's Choir (FIGURE 9). Built on the dimensions of 80' x 50', it rose three full stories and had in addition a dormitory on a fourth floor and above the latter an attic under a gambrel roof. Crowning the structure is a belvedere surrounded by a balustrade, from which the trombone choir of the community used to play chorales to herald special events and, in a minor strain, to announce the death of a member of the Church. This custom is still observed by the trombone choir, but today the musicians play from the belfry of the Central Moravian Church. During the Revolutionary War this Brethren's House was twice used as a hospital

for the Continental Army. On the second occasion in the year 1777, the Single Brethren had to vacate the building entirely and during the six months of this occupancy hundreds of soldiers died of wounds and fever. After the turn of the nineteenth century the Single Brethren's Choir declined rapidly and in the year 1814 the building was radically altered to serve as a boarding school for girls. Both interior and exterior were modernized. The exterior stone walls, which had resembled those of the buildings in the Bell



House group, were now covered with a veneer of stucco, inasmuch as the stone work had been defaced when the windows were enlarged. Today this building bears the name of Colonial Hall and is an important unit in the buildings of the Moravian Seminary and College for Women. Practically nothing remains of the interior arrangements of the Brethren's House. The surgery which had witnessed painful and pathetic scenes in the years 1776-1778 is now part of the college library, and the chapel which had served the Single Brethren's Choir has been incorporated into the recreation room of the College.

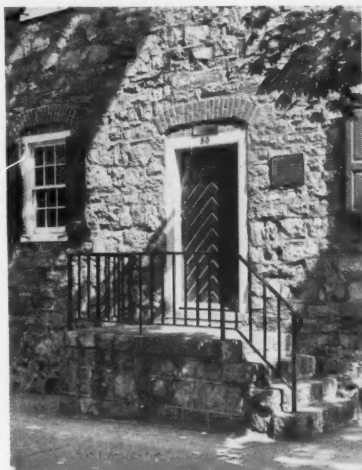


Fig. 12. Entrance to the first Brethren's House, now the Sisters' House (see Figure 7). Note the peculiar door pattern. Steps and railing are modern.

ONE MORE EIGHTEENTH CENTURY building remains to be described. The desirability of providing a house for the Widows' Choir had long been recognized and plans for its erection were made in the year 1766 (FIGURE 10). The site selected was on the south side of Church Street, directly opposite the Bell House Square. The doorway of the Widows' House is directly in line with that of the Bell House, and the length of the two buildings was originally identical, though later on the Widows' House was enlarged by an extension eastward. It was only the personal intervention of HENRY LAURENS which prevented the use of this house as a hospital during the Revolutionary War. This building today provides apartments for widows and unmarried daughters of Moravian clergy.

These eighteenth century buildings on Church Street in Bethlehem present a fairly homogeneous but far from monotonous architectural ensemble. The steeply pitched gable roof of the Gemeinhaus with its single range of dormers contrasts with the gambrel

roofs of the Bell House and Sisters' House with their double range of dormers. The fenestration and door openings are in the main symmetrical. The heads of the windows are square and in the stone buildings they are surmounted with shallow brick arches to afford a decorative accent. The color notes, too, are very pleasing. The cold gray of the slate roofs—the wooden shingles were replaced in the middle of the last century—blends with the warm gray of the masonry. Even the weather-boarded Gemeinhaus has been painted to match the warm gray of the masonry. The ivory of the wood trim and the dark green of the doors and shutters combine to give the whole facade further rhythmic accents.

The European prototypes of these buildings may be found in those erected in such Moravian centers in Europe as Neuwied-am-Rhein, Herrnhut, and Zeist (FIGURE 11). There is, however, one deviation to be noted: the Church Street buildings have sash windows and not the European casement type, an influence derived, according to Professor HOWLAND, from the English type windows of colonial Philadelphia. The doors also offer a contrast. The panel type, of course,

is found but most of them have beveled boards laid in an overall herringbone pattern (FIGURE 12). Many of the doors have the original hand-wrought hardware. The locks are large and heavy, but the hinges, particularly the double-S and butterfly design, are beautifully wrought (FIGURES 13 and 14).

There were, to be sure, other buildings in eighteenth century



Fig. 13. Bethlehem, Pennsylvania. Inside view of door (see Figure 12) with original handwrought hardware. Note the small transom above the door and the brick pavement.

Bethlehem, but only two or three of these, now private residences, survive. Several factors operated to prevent the Church Street buildings from falling under the blows of the demolition squads of nineteenth century "progress." First of all, the buildings have been

retained by the Church authorities either for educational or housekeeping purposes. Secondly, the very fact that Bethlehem remained a small village until the twentieth century obviated any boom in real estate. Finally, the traditional conservatism of the Moravians has instilled in them a consciousness of their herit-

age and a pride in whatever their forebears had accomplished. Today every effort is made to preserve these buildings and to have them appear "as they had been" in as far as it is possible. Concessions to modernity have been made only to the extent of slate roofs, central heating, plumbing, and electricity.

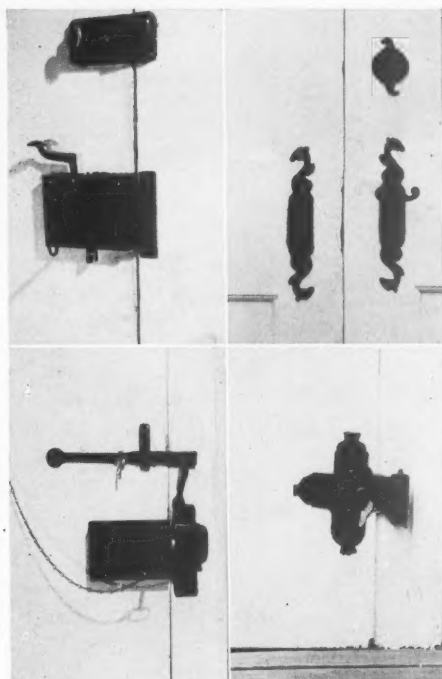


Fig. 14. Bethlehem, Pennsylvania. Original handwrought door hardware.

# SKELETONS

By J. Lawrence Angel

*Born in London of Anglo-American parentage, John Lawrence Angel is a graduate of Harvard University (A.B., 1936; Ph.D., 1942). His research profession of physical anthropologist has twice taken him to the Mediterranean, particularly Greece, with the aid of traveling fellowships from Harvard, the Guggenheim Foundation, and the Viking Fund. He has studied human skeletal material from the Athenian Agora and other American excavations as well as in Athenian, Turkish, and Cypriote Museums. He is now Assistant Professor of Anatomy and Physical Anthropology at the Daniel Baugh Institute of Anatomy of the Jefferson Medical College, and Research Fellow in Physical Anthropology at the University of Pennsylvania Museum, Philadelphia.*

**I**N THE PROCESS OF RECOVERING ANY SPECIFIC part of man's past the archaeologist is baffled at the levels of techniques, interpretations, and aims by one fact: the amazing variety of human activities. No single excavator could ever analyse all the materials, from Mesolithic microliths to pollen traces, oxidized coins, animal bones, swords, inscriptions, and enameled glass, which he might find in a single stratified site; nor would he claim to interpret from such materials the whole series of changes in social conditions of the inhabitants; or to state categorically the aim of all excavation. Such a comprehensive attack on man's development can succeed only with a team of specialists who are capable of doing an ethnology of successive cultures in the area they work in.

Even so, the final aim of archaeology in general and of classical archaeology in particular had best be left unstated. The obvious immediate aim is to accumulate more observations, and increasingly more objective observations, on the processes of cultural change: to add the time factor to studies of social function in modern primitive and civilized peoples. Subsidiary aims, such as preservation of the beauty created by

long dead artists, are also in general well understood.

But what is to be done with this sharpened knowledge of social growth? Can it be applied to our own luxurious but dangerous lives? Can power-scarred politicians profit by laboratory experiments on the ancient past? Can we learn from this past either the need or the way to conserve our resources and to substitute competition for warfare? Any final applications of

the fruits of archaeology plus history must be questions about which no democratic team of experts should agree, since each member of the team should have the point of view and final aim peculiar to his specialty and personality.



Patience. Restoration is an art whose perfection allows more accurate study of human biological processes.

**O**NE OF THESE peripheral specialties is physical anthropology: the study of human

variation in its biological aspect. And the physical anthropologist has methods, interpretations, and aims of his own which may strengthen or conflict with those of the archaeologist in any joint venture. His relation to the archaeologist is more general than that of the physicist asked to test charcoal samples for Carbon 14, for instance, since both archaeology and physical anthropology are branches of anthropology. Although

archaeology may specialize in architectural, ceramic, or epigraphical-historical problems, and physical anthropology may virtually become human genetics or biology, or ecology, or industrial designing, both disciplines deal with the development of man and in both



Anastasios (Tasso) Pantazopoulos matching fragments in the Agora Museum. Plastic and sandbox are at hand.

the essential motive is curiosity about the truth as in any pure science.

The major aim in study of human biology is the further unraveling of human evolution, although the physical anthropologist has considerable interest in applying whatever new knowledge he can gain (or whatever areas of unnoticed ignorance he can uncover) toward the reduction of racial and other wasteful prejudices. Other and more immediate goals are many: comparison of two biologically similar but culturally contrasting human populations, for example: Did population A change faster than B, or have better teeth or greater variation? How far and how fast is biological change produced by hybridization, or by selection by climate, by diet, by disease, or by social factors? How are such factors as these in micro-evolution related to changes in population size and in genic variability? How are the processes of child growth related in our own or other cultures to diet and to all these forces? What are the exact genetic and environmental determinants of growth rates and form of

bones and of other tissues? What are the biological as opposed to superimposed cultural sex differences? How far are different constitutions related biologically and culturally to aptitudes or to disease susceptibilities? What are the limits of adaptation of the human organism, and how consistently have different extreme conditions selected diverse genetic trends within modern peoples? and finally how can an unbiased and truthful social biological evaluation be made of the meanings of state of health, longevity, fecundity, genetic and phenotypic variability, and degree and timing of genetic mixture for the achievements peculiar to a growing society in contrast to a relatively static one? All these are questions demanding a cooperative attack. In those demanding time depth for their answer the archaeologist's cooperation is needed.

But the methods used to handle them can rarely be those of the laboratory scientist who can test his hypotheses by experiment. Like the archaeologist the physical anthropologist must use the particular social or historical experiment which he can discover:

here the only controls over the many variables in a cultural-ecological-biological process are exact observation and perceptive statistical testing of hypotheses. Animal experiments are invaluable as checks on such direct observation, as in problems of heredity, growth, social order, or psychological response. But in spite of such aids to understanding of human biology we still do not know the genetic versus environmental weighting to be given to most of the characters used in physical anthropology. Hence our methods of observation remain clumsy and apparently time-wasting.

Nevertheless the physical anthropologist can answer almost all the questions asked by the archaeologist and can thus do his part on the excavating team.

Usually the archaeologist wants to know sex and age at death of the occupants of a cemetery, with any comments which can be made on disease frequencies; causes of death (when assignable); longevity; and perhaps such details of appearance as stature or face form. Often he asks for information on origins of a people, the reality or massiveness of possible invasions

ARCHAEOLOGICAL INSTITUTE OF AMERICA • FIFTY-SECOND ANNUAL MEETING  
TORONTO, ONTARIO, CANADA • DECEMBER TWENTY-SEVENTH TO TWENTY-NINTH



deduced from cultural diffusions (often ceramic), and the identity or lack of identity between ancient and modern occupants of a given locality. Occasionally there are puzzles: a female skeleton in a monastic cemetery; the lone head from a decapitation; or a mass of dog and infant bones from a single urban well deposit. In such cases it is important to be sure of all sex criteria; to be able to tell executioner's slashes from *post-mortem* breakage; or to note that virtually all of 200 infant skeletons are newborn.

The reason why the physical anthropologist can make reasonable answers to the archaeologist's questions and to some of his own lies in the lability of bone. In spite of the fact that laymen and even some anthropologists regard bone as relatively unchanging and unaffected by environmentally caused changes which act on other organ systems, bone is most sensitive to physiological change. Both its calcium, phosphorus, and other mineral salt content and its tough gluey fibres (like the reinforcing rods in concrete) can be torn down or thrown up and rebuilt by special connective tissue cells (fibroblasts, chondroblasts, osteoblasts, osteocytes, osteoclasts, etc.) almost in a matter of hours, depending on the mechanical or metabolic stresses put on it.

Hence bone serves as a key to physiological age and endocrine balance, and reflects precisely both the environmental and genetic influences which moulded its possessor's physique. One needs only the proper knowledge and skill to deduce the conditions under which each population sample lived and its genetic relationships and store of usable variability.

But there are three major drawbacks in making such deductions. In the first place, bone cannot reveal an exact dietary history, but simply a reflection of certain vitamin deficiencies or diseases of metabolism present just before the time of death. It is true that lines of temporarily arrested growth visible in section or X-ray of the growth areas at the ends of long bones may appear as responses to severe childhood diseases or starv-

ation or excess phosphate absorption, and that the effects of gross deficiencies of Vitamins D and C or general malnutrition may cause relatively permanent skeletal deformities (rickets, osteomalacia, osteoporosis). But later bony changes usually mask earlier ones, just as the hypertrophy of incipient arthritis (on a fairly heavy-boned and robust skeleton) may mask and be confused with the marks of great muscular strength or with those of "normal" advancing age.

The second drawback is that anthropologists don't know how to separate effects of environment from those of heredity: as stated above, the inheritance of body build and of cranial and dental characters in man

is in the area of relative ignorance. And in addition the student is burdened with a system of measurements and observations which can test objectively whether or not two groups are alike in body and head characters, but which are not planned according to what *is* known of growth dynamics of the body and the effects of specific genes and of diet and climate on their rhythm. We continue to compare skulls or bodies as if all their external characters taken together would give an average measure of the degree of genetic similarity between two populations. Or else we criticise each other for daring to use such shortcuts as "types" or for concentrating on one or two well-tested genetic traits (such as the blood types) to the exclusion of other characters (like body build) which have in addition a certain cultural meaning.

Meanwhile we are trying to accumulate data on inheritance of normal body build and other traits. But this is slow and frustrating work: this writer has just been furnished with a laboratory to continue and expand his research program on genetics, body build, and social factors in relation to chronic disease, but he must still find research funds to hire technical help and buy additional instruments. There are only a few projects of this sort established. With our present ignorance in such matters we can do no more than to interpret results with common sense.



Healed osteoporosis in a third millennium B.C. child from Cheliotomylos. Nutritional deficiency or gene (thalassemia)?

TABLE I

Percentage of occurrence of six different types into which skulls of both sexes from circum-Isthmian Greece have been classified: to show the major trend and minor fluctuations in small scale evolutionary change with fluctuation in population density over a five thousand year time span.

PERIOD (The number of skulls available determines the length of each period used. Divisions between periods are chosen to fit changes in culture as well as archaeologists' datings)	Neolithic and Early Bronze Age	Middle Bronze Age (M.H. and L.H. II)	Mycenaean (L.H. III)	Cephalonia Submycenaean Insular group	Early Iron Age: Submycenaean to Geometric	Classic (and Archaic)	Hellenistic and Early Roman	Imperial Roman	Medieval	Turkish	Recent	Living males
DATINGS	a. 3300- 2000 B.C.	2000- 1500	1500- 1150	1270- 1070	1150- 680	680- 300	300 B.C.- 120 A.D.	120- 600	600- 1400	1400- 1800	1800- 1900	1939
TYPE C (Alpine) Short, wide-bulging brain- case, short, rounded, slightly flat face, edge bite, strong chin, non-salient nose.	16%	11	15	12	24	12	18	17	16	12	22	46
TYPE E (Mixed Alpine) Big, long-based brain- case, inflated forehead, short and slightly infantile jaw and face.	2%	17	8	15	13	10	15	15	4	8	9	10
TYPE F (Dinaroid) Short, purse-shaped brain- case, pinched forehead, long and droop- ing face, tilted palate, large nose.	11%	8	6	0	15	9	14	26	19	21	27	14
TYPE D (Nordic-Iranian) Long ovoid, deep braincase, muscular; sloping forehead, long & rectangular face, salient aqu- iline nose.	11%	33	11	10	20	27	22	15	21	18	16	3
TYPE B (Mediterranean) Small, linear, angled braincase, paedomorphic; light, nar- rowed face, incipient mouth projec- tion.	30%	9	23	27	19	20	11	13	24	29	17	14
TYPE A (Basic White) Long, rugged, angular, gabled & heavy-browed vault; robust jaws, short & coarse nose, rectangular orbits.	30%	22	37	38	9	21	20	15	16	12	9	13
Number of skulls in sample	44	36	71	40	46	99	108	82	70	49	103	37
Estimate or guess at population density per square kilometre	0-5	(10)	(25)	(25)	(20)	35?	32??	25??	18???	10	21	55+

NOTE: Even when accurately selected by matching standardized photographs, types are too artificial and far too rigid to express the flexibility of genetic change in any people. When we can identify segments or trends of morphology which tend to be inherited as units or to respond to stress in regular fashion, we can plot the frequency of these to give more meaningful results. The same will be done with frequencies of blood group genes determined from skeletons. Meanwhile types must be used only with the greatest caution.

THREE EXAMPLES MAY BE INTERESTING. Cranial osteoporosis in a Mediterranean population may indicate either vitamin deficiency (environmental) or the inherited defect of red blood cells known as thalassemia (Mediterranean or Cooley's anemia) seen in individuals inheriting a pair of recessive genes for this condition (one from each parent, each of whom must have been heterozygous for this trait). When osteoporosis appears in skull samples of Early Bronze Age and of Late Roman and Mediaeval dates in Greece but *not* in the intervening periods, is the cause more likely to have been genetic, involving a radical change in frequency of a not too common recessive gene, or a simple dietary deficiency?

The latter would be the obvious answer except that we do not know how far heterozygotes for the thalassemia gene may be physiologically more susceptible than normals to dietary lacks and hence may show up osteoporotic suddenly in a population under slight dietary stress. This point, plus selective factors which there is not space to discuss, may be important in modern Mediterranean famines with their economic and political complications.

A second case concerns general skull form. It is well known that desert populations show much more linear physiques than arctic and even temperate zone populations (of men or animals) with their protectively large mass compared to small surface area. In man, desert groups normally have narrow heads and faces as well as slender bodies. When one finds groups in Early Mediaeval Germany and England (Reihengräber and Anglo-Saxon cemetery inhabitants), and a fair sprinkling of ancient skulls in Greece (and Italy?), which resemble Bronze Age North Iranians (Hissar III) closely except in all breadth diameters of head and face, does one wipe out the resemblance by adding up and averaging all the measured differences? Or does one discount these as a single difference (narrowness through-

out of the north Iranian steppe-dwellers) caused by the difference in environment and conclude that there is a large measure of genetic connection between these groups?

Common sense favors the latter conclusion, since it avoids counting the same difference many times over in correlated characters (something the British biometricians have continually aimed to objectify, yet never achieved with their "coefficient of racial likeness"). Studies on immigrants here and elsewhere (for instance Hawaii) show that headform can change from environmental causes alone. But we do not know even from animal experiments just how much the head and face would narrow from direct effects on the growth process of desert diet and water and salt balance, and how much natural selection may have produced the observed desert linearity. Probably genetic and environmental and selective effects are more or less equally responsible for the observed contrast in head linearity.

Stature presents a similar sort of puzzle. For Greek male skeletons it runs as follows (formula estimates in centimetres):

Prehistoric Neol.-L.H. III	Early Iron Age	Classic & Hellenistic	Roman & Byzantine	Turkish
159.7 (26)	162.3 (25)	165.6 (22)	165.9 (19)	166.9 (35)

Though these are not large samples of skeletons even when one combines several chronological periods, it is statistically certain that there was a stature increase exceeding two inches. The obvious explanation is a dietary one. And there are many confirming data for the hypothesis that improved diet and living conditions were major factors in producing this stature increase as well as the concomitant rise in life expectancy and later decrease in arthritis. Improved living conditions seem the major direct and indirect causes of the notable stature increases in western countries over the past few generations.



**Athenians excavated by Rodney Young  
from graves of 8th to 6th centuries B.C.**

TABLE II

A few selected measurement and index averages of successive samples of male skulls from circum-Isthmian Greece showing, against a background of continuity, certain patterns of change: successive broadening of skull base, jowls, skull vault, and face; lengthening of skull base, then shortening of braincase; lengthening of nose and shortening of lower face and chin. Variability is high at times of isolation plus invasion, about average in phases of fusion after mixture, and still lower in phases of isolation without invasion.

PERIOD	Neolithic and Early Bronze Age	Middle Bronze Age (M.H. to L.H. II)	Mycenaean (L.H. III)	Cephalonia Submycenaean	Early Iron Age: Submycenaean to Geometric	Classic (and Archaic)	Hellenistic and Early Roman	Imperial Roman 360 A.D.	Medieval	Turkish	Recent	Living males 1939
APPROXIMATE CENTRAL DATE	2500 B.C.	1750	1325	1170	915	490	90 B.C.	360 A.D.	1000	1600	1850	1939
SIGMA RATIO (Mean variability = $\sigma$ s or Standard Deviations taken as % of $\sigma$ s of "normal" archaeological series from a single site and period)	112	123	99	105	105	104	110*	109	109	106	96*	92
Length of braincase, from front to back, in mm.	185	186	186	188	185	187	184*	183	183	182	180	180
Maximum breadth of skull vault or braincase	140	143*	140	139	141+	141-	143-	142	141	138	147	145
Height of vault from ear-holes to vertex	117	119	116*	115	116	116	116	116	118	116	116	119
Minimum breadth of forehead	96	96	96	97	96	97	97	98	98	96	97	98
Length of skull base (basion-nasion)	101	99	99	102	100+	102	101	102	102	101-	102	-
Breadth of skull base (bicondylar next to ears)	114	121*	122	120	126*	124	124-	124	123	-	-	-
Maximum breadth of face (bizygomatic)	128	133	130	130	132	132	131	134	132	128+	132	134
Breadth of jowls (bigonial at jaw angles)	94	97	100	-	99	103	101	101	105*	-	-	102
Minimum thickness of cheek muscle part of jaw	31	30	31	-	33-	32	33	32	32	-	-	-
Height of chin (point between incisors to bottom)	34	31	33*	30	33	33	31+	30	32-	-	-	(30-)
Height of upper face (nasion down to point between upper incisor teeth)	70	69	68	65	69	69	70	71	71	70	72	72
Height of nose down from nasion	50	49	50	48-	51-	51	51	52	52	50	53	53
Breadth of nasal opening	24	24	24	24+	24	25-	25	25	24+	25	25	25?
Cranial index (ratio of breadth to length)	76-	77	76	74	77	75+	77	78	77	76-	78	81
Fronto-parietal index (forehead: vault breadths)	69	67	68	70	68-	69	68	69	70-	70	69	68
Upper facial index (upper face height: breadth)	55	52	53	50	52	52+	53	53	54	54	55	53
Nasal index (ratio of nose breadth: height)	48	48	48+	52	48-	49-	49	48+	47	50	47	47?
Total number of male skulls available	24	21	42	29	27	64	72	59	50	25	99	37
* Average number for each measurement (discrepancy indicates degree of incompleteness of many skulls)	14	16	26	21	23	47	54	43	35	23	96	37

NOTE: Statistically significant changes from the preceding period, exceeding twice the standard errors, are italicized, and those exceeding 1.7 times their standard errors are starred. Larger samples may confirm other changes. And statistically confirmed trends, consisting in a series of insignificant changes all occurring in the same direction, are not indicated since they are usually self-evident. Submycenaean Cephalonians must be considered separately from the circum-Isthmian samples in general. These Cephalonians were an insular group which retained a special version of tendencies present early in pre-Greek mainland Greece and in Palestine and various Mediterranean islands. The Turkish period sample likewise is probably unrepresentative. It is overweighed by skulls (some of which are negroid) from post-Byzantine graves on the Athenian Acropolis and from the island of Aigina, though the size decrease may be correct. The sample of living excludes Anatolian Greek immigrants and is far too small to be representative.



But in this modern instance there are other factors: medical preservation of extra large male babies and of children whose too rapid growth would have exposed them to fatal infections; temporary effects of hybrid vigor from the additive effect of genes having side influence on growth speed; selective migrations; and conceivably other selective forces favoring tall stature. Some of these may have been at work in ancient Greece also. We cannot yet tell to what extent such immigrants as Achaeans or Dorians may have introduced genes for tall stature, or estimate how much of the observed stature increase might have this source.

It is clear that increase in stature must result from acceleration of growth rates or delay in cessation of growth. In the United States ending of growth at maturity has been shifting to younger and younger ages as the total growth process has speeded up in the last generation. Since different growth areas at joints and between skull and face bones each have their own growth speeds relative to each other, a change in total growth speed or in timing of specific spurts or final bony fusion of the growth areas will produce changes in limb proportions and in skull shape irrespective of other genetic or environmental forces. Certain skeletal shifts found in the Greek material partially parallel observations on university students and plausibly result from such effects of what JULIAN HUXLEY calls heterogony or relative growth (relative shortening of shins, lengthening of forearms, lengthening of base of the skull compared to shorter braincase, absolute size increase of the nasal cavity).

In the above discussion we have met the third drawback in making satisfactory deductions from bony remains: the paucity of accurately dated and well preserved skeletons. Something can be established from the Greek material which this writer has been privileged to study: over 700 adult skulls and 200 skeletons including both sexes. But these must be spread over a 5,000 year time span and divided into eleven successive chronological samples covering 15 to 30 generations apiece. On this basis one would need samples at least ten times the size of the present ones to get a real generation by generation picture of the biological history of the Greeks. Yet the available material is more numerous and better dated than that from any comparable Old World area, except Egypt.

Obviously we need further cooperation between archaeologist and physical anthropologist at the technical level of obtaining and processing skeletal material. This is a sensitive area. Every physical anthropologist has shuddered at tales of mass discarding of

skeletons. And every archaeologist has been or should have been driven to fury at the time needed properly to plateau and then brush off sticky earth from a crumbling skeleton. As a solution it is worthwhile to outline a general procedure for handling skeletons.

IN MOST TEMPERATE CLIMATES (including Greece) where bodies are buried in clayey soil one can expect no more than 5% to 15% of the burials to produce usable material. Even among these it will be impossible to preserve the ends of many long bones. Hence bone lengths should be measured accurately in the ground. It is wasted effort to collect fragments too incomplete for restoration, and proper discarding will save much time. As criteria for saving skeletons the general condition of the bones and lack of chemical dissolution are better than state of breakage. A skull broken into hundreds of fragments can be accurately restored and studied if every fragment is collected. Once he has decided to keep a given skeleton or skull the excavator must not overlook even the smallest bone fragments.

Probably the best technique for excavating a flexed or extended earth burial is to eschew over-careful cleaning after the initial plateauing and brushing, and to remove bones with a fair coating of earth. This applies particularly to the skull, which should be bedded down in earth for its trip to the field museum or preparation tent. After the bones have dried thoroughly in a shady place they should be carefully cleaned, washed if tough enough, and packed for shipping to the home base. It is not necessary to separate and label each region of any skeleton. With material buried in sand, or in mud and water, this whole process will be easier, since these conditions favor bone preservation.

The reader will notice an omission: "preservatives" such as Duco or Alvar solutions. The reason is that these are almost never usable in the field. Nothing has been more destructive to ancient skeletons than use of hot paraffin wax. This penetrates cracks in deteriorated bone and splits it like frost-heaves in a road: when one needs to remove paraffin from the surface and to dissolve it out in order to glue together the fragments, the bone will simply disintegrate and require days of labor. This applies, less stringently, to other field preservatives, which weld dirt and bone together in a distorted mass. Skeletons over 7,000 years old may be partial exceptions, since here more field care will be used in any case and cheese-soft fragments will be worth saving.

In order to harden brittle bone after it has been cleaned in the home museum a good procedure is thorough impregnation with some toluene- or acetone-soluble plastic, such as a polyvinyl acetate, which is itself adequately tough when dry. Air must be removed from the visible spongy interstices and microscopic canaliculi in order to allow the plastic solution to penetrate. Thorough soaking may be adequate, but impregnation under negative pressure is best. After they have dried, skull fragments are arranged in order on a table, like a Mercator projection of the globe. For skull-mending a slow-drying plastic, like one of the Alvares, is best, since this allows slight adjustments to be made for warping or wear as the whole skull is completed. Gaps should be left open or bridged if necessary by copper wire stiffened with a coat of plastic; plaster of Paris is generally too heavy and too wet. The necessity of restoring the sphenoid and other complex but key bones of the skull base demands a slight knowledge of anatomy, easily learnt by an intelligent person, as shown in the illustrations of TASSO restoring skulls in the preparation room at the Athenian Agora Excavations, during the spring of 1949.

The technique of measuring bones is still largely that which was established by VIRCHOW, BROCA, MANOUVRIER, PEARSON and other late nineteenth century scientists. Measurements are oriented across obvious growth areas. But many use growth centres as endpoints (for instance nasion, above the root of the nose) or are too inclusive for interpretation. And even the listing of details of form which are seen in a general way to be inherited does not make up for the non-genetic orientation of present descriptive methods. It is easy, for example, to measure saliency of the nasal bones with a goniometer relative to an arbitrary baseline (VIRCHOW's Frankfort plane), or to classify degrees of aquilinity of the bony nasalia in a subjective rating scale.

But what does a hawklike or a vertical nose mean? Are these inherited as traits in themselves, as family portraits might indicate? How much does nasal saliency depend on the chewing mechanism? Stresses from the upper incisor teeth pass up into the forehead region of the skull vault through the buttressing upper half of the nasal bones, as any one can testify who has suffered a broken nose. If the anterior-posterior placing and the tilt of the palate relative to the lines of pull of the chewing muscles are actually the main determinants of bony nose form, what genetic and dietary and habit-formed forces determine these? Are the palate-growth genes as resistant to dietary and

environmental (e.g. orthodontic) influences as are those which largely determine type of bite? Are they mostly the same genes? The chains of functional dependence and growth gradients which intervene between genetic potentialities and actual adult form are simply too little known to answer these questions.

Three consequences are: (1) careful and precisely oriented photographs must be published for future scientists; (2) the present extremely laborious titration and concentration techniques for determining blood types from skeletons must be refined and extended; (3) all present conclusions as to population origins, effects of invasions, and strength of genetic continuity in any population remain tentative, though somewhat surer than guesses deduced from myths or from pottery types alone. On the other hand the sex, age, general body build, and pathological peculiarities of a skeleton can be stated within a small margin of error. And the homogeneity or variability of a given sample can be objectively and fairly accurately measured.

This question of variability and mixture is of much interest both for evolution and the growth of civilization. It is a question which can be worked out only through a combined attack to show what biological mixture has occurred, what new ideas or objects have been introduced or invented, and what kinds of psychological reactions have accompanied the mixing. To this writer it is the fundamental question in study of historical change, and one whose disentangling should promote mutual understanding between historians, archaeologists, and anthropologists.

THE STIMULATING EFFECT of mixture and exchange of ideas and the corollary challenge of (friendly?) competition are things which make sense only in relation on the one hand to the total ecological situation and on the other to the energy level of the population: the actual sources of support and development. On the whole these are areas which have been little investigated. And it is quite clear that to achieve a full picture of them geologists, geographers, palaeoclimatologists, zoologists, botanists, soil chemists, and population experts must be added to the archaeological team.

But, leaving aside the ecological end of this picture, a great deal can be done immediately to examine changes in the energy level of the populations of Greece. We need to set down and then to add to our data on health and medical knowledge (from skeletons and from written records), on life expectancy

(from skeletons and from tombstones), on the infant and adult death rates (from cemetery excavations plus census estimates), on population size and composition (from records and size of cemeteries and settlements), on diet and methods of farming (from archaeological remains and literature), and on housing, clothing, and general living habits (from archaeology).

It is noteworthy that Classical archaeology has accumulated more materials for such an analysis of energy level than have Americanists (except perhaps in the Southwest) who as anthropologists may have a greater interest in this problem. This is largely a function of the greater cultural wealth of the Mediterranean peoples in contrast to Maya or Inca or Hopewellians. With the addition of only a few more data we will be able to make a cooperative study of interrelationships between energy level, ecological condi-

tions, and cultural change, using Greece as a laboratory area. If such a study can be made at all objectively, it should be possible to analyse the psychological and biological aspects of mixture against this as background and to compare the whole system to what is now going on in our own culture.

This sort of research sounds very airy and far removed from a statement of the relationship between ancient skeletons and the artifacts dug up around them. But it seems to the writer that the time is ripe for it. If the kind of teamwork can be developed to attack problems of this sort, archaeology need no longer class itself as a luxury profession, but rather as part of the social sciences whose contributions should produce a way of thinking helpful to our education, as well as interesting entertainment for intellectuals.

*On the cover*

A PENDANT JEWEL OF THE METROPOLITAN ARSENIUS

The cover illustration is of a late Byzantine jewel in The Walters Art Gallery. It is in gold and niello and set with semi-precious stones, and it is one of the most splendid pieces of Byzantine jewelry that have survived. The jewel is made in two main parts, an outer case with cover and an inner cross which can be lifted out to serve as a pectoral by itself. The cover is set with a large amethyst cameo of the Madonna and Child surmounted with filigree work studded with stones, as is also the back. On the interior is a long inscription in niello. The cross has a crucified Christ, also in niello.

This jewel, according to the inscription, was made for the Metropolitan Arsenius of Serres, whose name appears in several churches in inscriptions dating from the mid-sixteenth century. According to the inscription on the cross, the Metropolitan Arsenius eventually presented the jewel to the monastery of the Holy Trinity on the island of Chalke.

# THE SYMBOLISM OF CHRISTIANITY

By Margaret A. Alexander

*Illustrations from photographs by Robert L. Alexander, by courtesy of the Departments of Antiquity of Algeria and Tunisia and the Musée Lavignerie, and with the aid of a grant from the Colt Archaeological Institute of New York.*

TO READ EARLY CHRISTIAN LITERATURE AND its arts without a knowledge of its symbolic content is to fail to appreciate its very significance. Only the most common symbols of the early Church are defined in this dictionary; their development is not traced. Later variations, additions or expansions are interesting to the specialist and reveal much of the subtlety of human thought. The basic meaning of any symbol seldom, if ever, changed. No attempt is made to suggest regional variations in interpretation or presentation. Whether or not there was a pagan background for the form or even the idea is indicated only briefly.

By repetition and combination symbols became a pictorial language which appears simple but is highly complex in all its implications. Symbols may be interpreted by the inscription. Thus the anchor (hope) with monogram (Christ) may be coupled with the epitaph *Spes in Deo* or *Spes in Christo*. Not many symbols are conveniently explained by accompanying inscriptions. The sources for understanding them are literary. Most of the symbolism was established in the Bible, but subsequent writings and events gave rise to new, more specific, or more elaborate types.

## ALPHA AND OMEGA

*I am the Alpha and the Omega, the first and the last, the beginning and the end (Rev. 22:13).*

A and Ω, the first and last letters in the Greek alphabet, symbolized Jesus Christ. They were combined with the cross and monogram, particularly in the fourth through sixth centuries when the Catholic belief in consubstantiality was threatened by the Arian doctrine. To the Catholics, the addition of A and Ω affirmed the divinity of Christ (FIGURES 5 AND 11).

## ANCHOR

*Lay hold of the hope set before us: which we have as an anchor of the soul, a hope both sure and steadfast (Hebr. 6:18-19).*

To the early Christians practically anything connected with the sea had religious significance. The anchor was



Fig. 1. Mosaic pavement from cubiculum, Catacomb of Hermes, Sousse (Hadrumetum), Tunisia. Possibly end of third century A.D. Sousse, Museum.

an early and common symbol. Strangely enough, the pagans attached no symbolic meaning to it. Among Christians, the anchor, on sepulchral monuments, expressed certainty that the deceased had reached port, i.e., heaven. It might be surrounded by fish (FIGURE 1), an emblem for the faithful as well as Christ. Because of its shape, the initiate saw in the anchor, as in the trident, a substitute for the cross. When entwined by a dolphin, as in FIGURE 1, it became a forceful disguise for the Crucifixion.

## CANDLES, CANDELABRUM

*These are . . . the two candlesticks standing before the Lord of the earth (Rev. 11:4).*

Candles were thought to light the way of the soul from earth to heaven and signify that the scene took place in Paradise. Candles or torches were used by both pagans and Christians in funerals. They were part of the Christian cult of saints and martyrs (FIGURE 2).

## CROSS

*But far be it from me to glory, save in the cross of our Lord Jesus Christ, through which the world hath been crucified (Gal. 6:14).*



Until the sixth century, the symbolic rather than the realistic cross was depicted because of the stigma attached to crucifixion. The Christians saw the cross in many guises—the anchor (FIGURE 1) and trident, the yard-arms of a ship (FIGURE 8), the figure in prayer (FIGURE 6), the letter *tau* (T). The cross form was not unknown in pagan art. The  $\text{卐}$  or swastika signified the four winds, for example, and was apparently the earliest type adopted by the Christians. The equal-arm cross or Greek cross  $+$  was a monetary sign on pagan coins. In Christian art and epigraphy, it was most common in the east but appeared also in the west. The Latin cross  $\dagger$  may have been derived from the processional crosses. With the recognition of Christianity under Constantine, the cross was the great symbol of triumph. The sense of triumph and resurrection was heightened by the finding of the True Cross under the instigation of Helena, Constantine's mother.

#### CROWN, GARLAND, WREATH, CIRCLE

*Be thou faithful unto death, and I will give thee the crown of life* (Rev. 2:10).

In classical religious games and mysteries, in the Jewish and Christian religions, the crown was the reward of vic-



Fig. 2. Silver capsella from Ain Zirara, Numidia. Top, with Christian martyr. Copy, Algiers, Museum; original, Rome, Vatican Library, Museo Sacro.



Fig. 3. Tomb mosaic of Flavius from Bordj-el-Ioudi (Furnos Minus), Tunisia. Fifth century. Tunis, Musee Alaoui.

tory. For the Christian it was never a material, but a spiritual gain. St. Paul said in I Cor. 9:25, *And every man that striveth in the games exerciseth self-control in all things. Now they do it to receive a corruptible crown; but we an incorruptible.* Clement of Alexandria (†219) realized the dangers of adopting the pagan crown because it smacked of magic and idolatry. He, however, speeded the transference by comparing it with the Crown of Thorns. The crown was the attribute of saints and martyrs (FIGURE 2). The wreath or circle enclosing a monogram (FIGURE 2) expressed Christ's triumph over evil. It quite naturally became a symbol of immortality.

#### DEER, HIND, HART

*As the hart panteth after the water brooks, So panteth my soul after thee, O God* (Ps. 42:1-2).

The deer, flanking a vase or the Four Rivers of Paradise (FIGURE 7), stood for the catechumen coming to receive baptism or for Christians desiring to partake of the Holy Sacrament.

#### DOVE

*And the dove came in to [Noah] at eventide; and, lo, in her mouth an olive-leaf plucked off* (Gen. 8:11).

Noah in the ark, receiving the dove, was a symbol of salvation. The flood, which washed away the crises of men, was considered a forerunner of baptism. The dove with branch symbolized divine peace assured the soul through baptism. Peace and spiritual refreshment, to be received in Paradise, was expressed by doves perching on vases (FIGURE 3) or pecking at baskets of fruit in typical antique manner. Thus the dove was the symbol of the soul. It was combined with other Christian symbols, e.g., the crown, signifying the soul in celestial glory; with the monogram, the soul baptized (FIGURE 6); with the ship, the soul sailing to heaven (FIGURE 8). It was also the embodiment of the Holy Spirit which descends at Christ's Baptism in the form of a dove.



Fig. 4. Epitaph with Good Shepherd from Christian church of Damous el Karita, Carthage, Tunisia. Carthage, Musee Lavigerie.

#### EVANGELIST SYMBOLS

*And the first creature was like a lion, and the second creature like a calf, and the third creature had a face as of a man, and the fourth was like a flying eagle (Rev. 4:7).*

These creatures, foretold by Ezekiel, were adopted for the Four Evangelists. The lion was Mark; the calf (or bull), Luke; the man (or angel), Matthew, and the eagle, John. In the earliest Christian representations, the Evangelists were symbolized by four scrolls, four books representing the Four Gospels, or the Four Rivers of Paradise (FIGURE 7).

#### FISH (DOLPHIN, ETC.)

*And he took the five loaves and the two fishes, and looking up to heaven, he blessed them, and break (Luke 9:16).*

From the Miracle of Loaves and Fishes, the fish came, in the third century, to signify the Eucharist. As symbolic of Christ, it was particularly venerated because  $\text{I}\chi\theta\upsilon\varsigma$ , the Greek word for fish, was an acrostich, corresponding to the first letters of  $\text{\textit{\text{I}}\text{η}\text{σο}\text{ϋ}\text{ς}\text{ }\text{Χ}\text{ρισ}\text{τ}\text{ος}\text{ }\text{Θ}\text{ε}\text{ο}\text{ϋ}\text{ }\text{Υ}\text{ι}\text{ος}\text{ }\text{Σ}\text{ω}\text{τ}\text{η}\text{ρ}\text{ς}}$ , 'Jesus Christ, of God the Son, the Savior.' Since Christ called Peter and Andrew saying, "Come ye after me, and I will make you fishers of men" (Matthew 4:19), the fish

was also symbolic of the Disciples. The faithful were likened to fish, born from the water of baptism. Fish flank the anchor (FIGURE 1) signifying the faithful swimming to the islands of the blest. From pagan representations of the dolphin, which on classical tombs bore the souls to the Elysian fields, the Christians probably borrowed this symbol.

#### FOUNTAIN OF LIFE

*For the Lamb . . . shall guide them unto fountains of waters of life (Rev. 7:17).*

The Fountain of Life was usually represented as a chalice, occasionally running over with water (FIGURE 3) or from which a vine springs (FIGURE 8). The chalice was the eucharistic vessel from which doves (souls) partook of communion (FIGURE 3).

#### GOOD SHEPHERD

*I am the good shepherd: the good shepherd layeth down his life for the sheep (John 10:11).*

The Good Shepherd was the psalmist's shepherd as well as that of the New Testament (FIGURE 4). His pose was derived ultimately from archaic cult-images of Hermes Criophorus but more directly from Graeco-Roman types of the shepherd-hero, Aristaeus. The Good Shepherd was as powerful to the early Christians as the Crucifix is today.



Fig. 5. Monogrammatic cross from church in Sbeitla (Sufetula), Tunisia. Sixth century. Tunis, Musee Alaoui.

#### INRI

*And Pilate wrote a title also, and put it on the cross . . . Jesus of Nazareth, The King of the Jews (John 19:19).*

INRI, the abbreviation for  $\text{I}\text{E}\text{S}\text{V}\text{S}\text{ }\text{N}\text{A}\text{Z}\text{A}\text{R}\text{E}\text{N}\text{V}\text{S}, \text{R}\text{E}\text{X}\text{ }\text{I}\text{V}\text{D}\text{A}\text{E}\text{O}\text{R}\text{V}\text{M}$ , is still customarily placed above Christ's head in representations of the Crucifixion.  $\text{I}\text{H}\text{S}\text{ }\text{X}\text{P}\text{S}$  was the



Fig. 6. Tomb mosaic of Abdeu from Christian cemetery, Tabarka, Tunisia. Fifth century. Tunis, Musee Alaoui.

earliest abbreviation of  $\text{IH}\Sigma\text{OY}\Sigma\ \text{XPI}\Sigma\text{TO}\Sigma$ , Jesus Christ. It has frequently been confused with  $\text{IESVS HOMINVM SALVATOR}$ , Jesus, Savior of Man;  $\text{IN HOC SIGNO (VINCES)}$ , in this sign (conquer);  $\text{IN HOC (CRUCE) SALVS}$ , in this (Cross) salvation. The contractions of  $\text{'I}\eta\sigma\omega\upsilon\varsigma\ \text{X}\rho\iota\sigma\tau\acute{o}\varsigma$  to  $\text{IC XC}$  appeared early and were particularly common in Byzantine art. From the third century  $\text{IH XP}$  was also used.

#### LAMB

*Behold, the Lamb of God, that taketh away the sin of the world!* (John 1:29)

The lamb was a symbol of Christ, the *Agnus Dei*, sacrificed without blemish. This idea goes back to the substitution of the ram for Isaac in Abraham's sacrifice. Like the fish, the lamb stood for the faithful, and, in the procession of twelve, as the twelve Apostles.

#### MONOGRAM

To the pagans and the earliest Christians X (Greek chi) was merely an abbreviation. Later it represented Christ. The Constantinian monogram  $\text{X}$ , from the first two letters of  $\text{XPI}\Sigma\text{TO}\Sigma$  (FIGURE 11), was used on coins and the labarum, the military standard, by Constantine. As a sign of triumph, it undoubtedly stems from Constantine's vic-

tory under the Lord's sign and the subsequent recognition of Christianity. A simpler monogram was the rho and Latin cross  $\text{+$ , the monogrammatic cross (FIGURE 5). This type was combined with the Constantinian monogram,  $\text{X}$ . A fourth type was the star monogram  $\text{X}$ , of Greek Christian origin, standing for the I and X of  $\text{'I}\eta\sigma\omega\upsilon\varsigma\ \text{X}\rho\iota\sigma\tau\acute{o}\varsigma$ . It was elaborated in the sixth century into  $\text{X}$ . Any monogram enclosed in a wreath or circle symbolized God's reign on earth and the triumph of Christ over evil (FIGURE 8).

#### ORANT

Like the Good Shepherd, the Christian representation of the orant, the personification of prayer, was borrowed from antiquity. It was most frequently used as a symbol of the soul. It first appeared in female form but later lost its anonymity and became, if not the portrait, at least a representation of a specific person (FIGURE 6). Its pose, arms outstretched in prayers, resembled the cross. Thus it was adopted for figures symbolizing deliverance, Daniel in the lions' den, Noah in the ark, the Three Hebrews in the fiery furnace. Later it was used for saints and particularly the Virgin Mary.

#### ORPHEUS

Pagan influence is strongly felt in the adoption of Orpheus as a symbol for Christ. Since Orpheus had the power to bring Eurydice back from Hades, the Christians saw in him a kind of Good Shepherd. As Orpheus charmed the savage beasts, so Christ charmed the most obdurate souls. Some writers saw Orpheus as a pagan prophet of Christianity, others as the more abstract symbol of immortality.



Fig. 7. Part of a mosaic pavement from Bir-Ftouha, Carthage, Tunisia. Sixth century. Tunis, Musee Alaoui.



Fig. 8. Tomb mosaic of Felix from Christian cemetery, Tabarka, Tunisia. Fifth century. Tunis, Musee Alaoui.

#### PALM (BRANCH, TREE)

*The righteous shall flourish like the palm-tree (Ps. 92:12). I saw, and behold, a great multitude . . . standing before the throne and before the Lamb . . . and palms in their hands (Rev. 7:9).*

The palm has long been an emblem of victory, especially to the Christians as symbolic of the branches strewn on the way of Christ's triumphal entry into Jerusalem, commemorated in our Palm Sunday. It became the emblem of martyrdom. The palm tree was used for the Tree of Life, as in the Theodoulos mosaic (FIGURE 9), where it rises above the chalice, the Fountain of Life.

#### PEACOCK

*He . . . spoke of the resurrection of the Christ, that neither was he left unto Hades, nor did his flesh see corruption (Acts 2:31).*

The peacock was the symbol of resurrection and immortality in both pagan and Christian art. Pliny, in his *Natural History*, Book 10, Chapter 22, says that each winter the peacock lost his tailfeathers and regained them in the spring. In this and the fabled incorruptibility of his flesh, the Christians saw a symbol of Christ.

#### PHOENIX

Like the peacock, the phoenix was an emblem of immortality and resurrection. Of Asiatic origin, he was in Egyptian religion the embodiment of the Sun God and in classical art a sign of resurrection. The phoenix, according to legend, lived 500 years in the Arabian desert. He then went to Heliopolis where he burned himself on an altar in the Temple of the Sun. He rose again from his own ashes, young and beautiful as ever.

#### RIVERS (FOUR RIVERS OF PARADISE)

*And a river went out of Eden to water the garden; and from thence it was parted, and became four heads (Gen. 2:10).*

The early Christians saw the Four Rivers as the Four Gospels, going out to the four parts of the world, spreading the teachings of Christ and bearing baptism. The deer and hind kneeling at the rivers to drink were the catechumen receiving baptism. Sometimes a cup or chalice stands on the mount (FIGURE 7) in reference to the eucharist; in other representations it is the Lamb of God.

#### SHIP

*And Jehovah said unto Noab, Come thou and all thy house into the ark; for thee have I seen righteous before me in this generation (Gen. 7:1).*

The ship, especially Noah's ark, was a symbol for the Church of Christ. St. Augustine, when made bishop of Hippo, said that he took "the second place at the helm, although I did not know how to hold an oar" (Ep. 21, 1). Life itself was reflected in the ship with death as the port. In ancient Greek mythology a boat carried the souls to



Fig. 9. Theodoulos mosaic from Sousse. Third century. Sousse, Museum.



Hades. The Christians' more hopeful belief was expressed in lighthouses or the monogram of Christ toward which the ship sometimes sailed. As the anchor was symbolic of a sure hope, so the ship and its voyage were symbolic of a sure journey to everlasting life in Christ (FIGURE 8).

#### TREE OF LIFE

*The tree of life also in the midst of the garden (Gen. 2:9). To him that overcometh, to him will I give to eat of the tree of life, which is in the Paradise of God (Rev. 2:7).*

The Tree of Life is a very complex symbol, particularly with its pagan background. It was the Tree of Life which nourished the faithful through its fruit (eucharist). It was a symbol of resurrection, because trees lose their leaves in winter, as the peacock loses his feathers, and regain them in spring. The Tree of Life was represented in many forms, the naturalistic palm tree of Theodoulos' mosaic



Fig. 10. Pagan altar of Julia Spisina. Third century. Church, Maktar, Tunisia.

(FIGURE 9), as the vine, and particularly the cross, jeweled and surrounded by flowers. Of special significance for this season is the derivation of the Christmas tree from the Tree of Life.

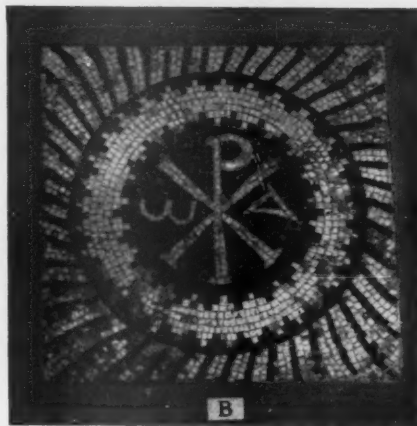


Fig. 11. Mosaic with Constantinian monogram, from Sousse. Sousse, Museum.

#### VINE

*I am the true vine, and my Father is the husband man . . . ye are the branches (John 15:1, 5).*

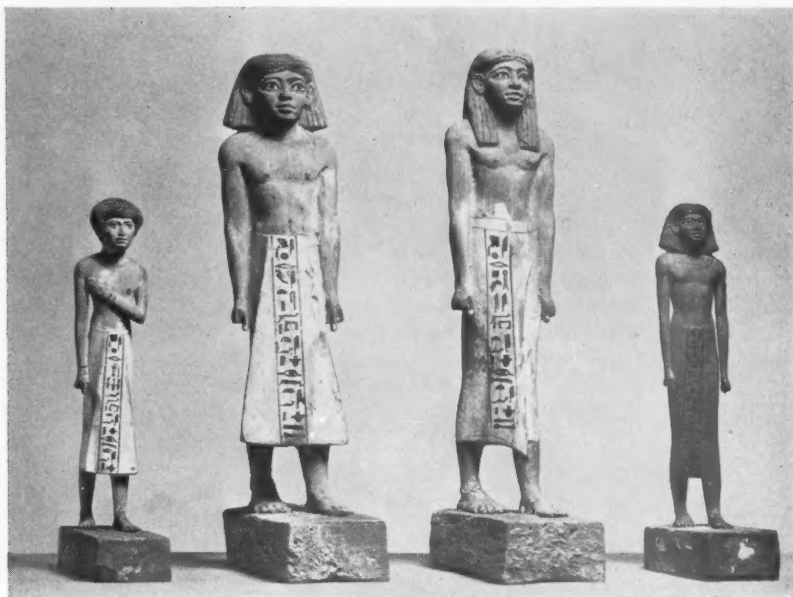
In addition to representing the Tree of Life, the vine was a symbol of the Church and the eucharist. To the pagans the vine was an important Bacchic symbol and an emblem of autumn. The community of ideas in the first centuries of the Christian era is graphically illustrated by a pagan altar from Maktar, Tunisia (FIGURE 10). Since the vine was acceptable in Christianity, this altar had been reerected in a Christian church. The vine springing from a chalice prefigures the Christian form (FIGURES 8 AND 9).

#### X

X, the Greek chi, first letter of *Χριστός*, Christ, became later a shorthand symbol, e.g., Xian or Xn for Christian, Xnty or Xty for Christianity, and

MERRY XMAS

# MIDDLE-KINGDOM EGYPT



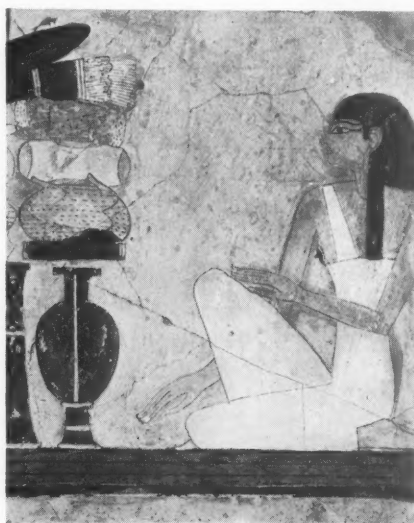
THE WALTERS ART GALLERY, BALTIMORE, HAS scheduled a temporary exhibition called "Egypt in the Middle Kingdom," running from March 3 through April 8, 1951. The purpose is to emphasize the remarkable artistic achievements of the Egyptians at a period when they already had established a tradition and still were uncontaminated by strong foreign influences.

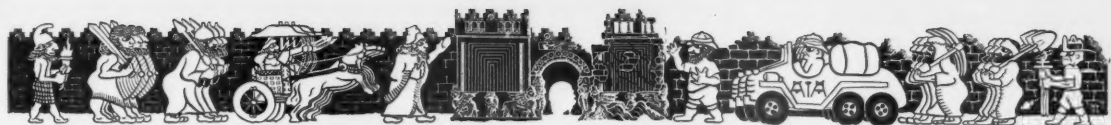
The remarkable "Middle Kingdom (the dates are around the twentieth century, but B.C. instead of A.D.) was considered a Classic era by the later Egyptians. Its literary productions were honored and copied, so that more Middle Kingdom creative literature has been preserved than one would expect. Large monuments of the period have suffered cruelly, but through diligent effort many have been reconstructed on paper. Smaller works of art, such as every museum pos-

sesses, always carry a conviction of assurance, of honesty and of a competency of workmanship. Jewelry and relief sculpture are outstanding. Though the supply is limited, America has a rich share of such items because of the excavations in which our older institutions participated. Some of the items historically most

important, from museums in the United States and Canada, are being lent to supplement the collection which Mr. HENRY WALTERS acquired personally. It would be easy to spread these items beyond the one room to which the exhibition will be limited.

The two illustrations are of Walters items to be featured in the exhibition: a set of four tomb figures of wood, belonging to a certain Itef-ib whose tomb was discovered at Asyut, and a painted fragment with a woman kneeling before food offerings, from the wall of an unidentified tomb.—D. K. H.





# ARCHAEOLOGICAL NEWS

## *Prehistoric bone maladies*

The bone aches of prehistoric man are being diagnosed with the help of X-rays as an aid to present-day medicine. He suffered, the pictures show, from about the same ailments as are common today, including cancer of bone, fractures, arthritis, and bone infections, including bone tuberculosis. The feet of an Egyptian mummy approximately 4,000 years old show a bad case of hammer-toes and other bone deformities.

The work is likely to be of great value, because it shows bone maladies often in a much more advanced condition than would be likely to be encountered today. Prehistoric people could do nothing about them and were forced to let them run their course and accept the resulting deformities; today the discomfort would quickly drive the victim to a physician.

Of special historical interest is the evidence of tuberculosis of the bone among ancient Indians. There had been considerable dispute as to whether the tubercle bacillus was known in the New World before the arrival of white men.

Other bones studied show changes on their surfaces and by X-ray very suggestive of syphilis. The definite existence of syphilis among the Indians before the time of Columbus is still a debated point.

The work is being done, on specimens from the collections of the Smithsonian Institution in Washington, D. C., by Dr. WILLIAM J. TOBIN, Washington orthopedic surgeon, aided by Dr. D. J. O'REGAN of the Gallinger Hospital staff, in cooperation with Dr. T. D. STEWART, Smithsonian curator of physical anthropology.

## *Metropolitan Bronzes*

Perennial favorites with Museum visitors, two hundred of the finest bronzes in the Metropolitan Museum of Art's vast collections, ranging in date from 2600 B.C. to the nineteenth century, are

assembled in a special exhibition to be held at the Museum from November 17 to January 21. A bull's head from Sumer is the earliest piece; a special attraction for historians of Greek art is a recently acquired Athena of about 460 B.C. which once belonged to LORD ELGIN. ALAN PRIEST, curator of Far Eastern Art, is chairman of the committee of curators which selected and installed the exhibits.

## *ASCSA Summer Session*

The summer sessions of the American School of Classical Studies at Athens will in the future be conducted jointly by the School and the Bureau of University Travel. The 1951 session, which will last six weeks, from June 25 to August 4, will be directed by our Associate Editor, Professor GEORGE E. MYLONAS of Washington University, St. Louis, Missouri.

The sessions are open to graduates of United States or Canadian colleges who have taken advanced work in Classics; specially qualified undergraduates will also be permitted to enroll. \$250.00 scholarships awarded by regional or local classical associations for these sessions will be matched by the School. The cost for six weeks, including tuition, room, board, and travel in Greece, will be \$490. This does not include passage to and from Greece. The B.U.T. has reserved space on the *Nea Hellas* (cabin accommodation \$335) sailing from New York about June 8.

## *Pylos Tablets*

The curtain surrounding the six hundred clay tablets, inscribed in Minoan Linear Script B or a script closely resembling it, found at Pylos in southern Greece in 1939, by CARL W. BLEGEN of the University of Cincinnati, was lifted momentarily at Philadelphia when Professor BLEGEN informed members of the American Philosophical Society that he and EMMETT L. BENNETT of Yale have identified 124 symbols and

have compiled a glossary of 1300 words. The language has not been identified, and neither the pronunciation nor the meaning of any of the words is understood; but the nature of the texts seems clear. They are bookkeeping records, and steady study should ultimately bring their decipherment.

## *SPRS, SPHS*

Miss M. V. TAYLOR, secretary and editor of the Society for the Promotion of Roman Studies, has asked us to report the increase in individual membership fees in the Society from £1 1s. to £2, and it was expected that the Society for the Promotion of Hellenic Studies would shortly follow suit. New Student-Associates will now pay £1. The increase is not obligatory upon old members, but those who can afford it are urged to increase their subscriptions voluntarily to £2.

Membership includes subscription to the admirable *Journal of Roman Studies* (sc. *Journal of Hellenic Studies*), and use of the library maintained jointly by the societies.

Effective January, 1951, library and other institutional memberships will be £2. At current exchange quotations this sum is about equivalent to \$5.60.

## *Kicotan Collection*

ALVIN W. BRITTINGHAM, of Hampton, Virginia, has presented to the Smithsonian Institution a collection of artifacts of both European and Indian manufacture, which have been found by surface exploration and excavation at a site called Kicotan on the shore of Hampton Roads. There is no historical record of a village at this spot, but a local tradition holds that a trading post was established there by the Jamestown colonists, and the area of the site, about 100 acres, the variety and great numbers of the objects found, ranging from tomahawks and pottery to a sword hilt and spurs, and the foundations of permanent buildings, including a brick

oven and a lime kiln, show that a permanent settlement, the second or third oldest in the New World, was envisaged.

The site is named for the Kecoughtan Indians, who were especially friendly to the early colonists. The date of establishment must have been before 1610, because in that year Governor GATES expelled all Indians from the neighborhood.

#### *Frantz Reprints*

In anticipation of special demand for copies of Miss ALISON FRANTZ' photographic article, *Truth Before Beauty*, on pages 202 to 214 of this issue, we have run off a number of reprints, which may be ordered from the business office of ARCHAEOLOGY, 100 Washington Square, New York 3, N. Y. These are on sale at 35¢ apiece, or \$3.00 in lots of 10.

#### *Early Campers*

The emergency archaeological survey of areas to be flooded by federal dams, a cooperative project of the Smithsonian Institution, the National Park Service, and the Bureau of Rec-

lamation, continued through 1950. We expect to print an extended summary of this work in the Spring, 1951, issue.

In the upper reaches of the Angostura Reservoir near Hot Springs, South Dakota, a party directed by RICHARD P. WHEELER discovered camp sites of nomad hunters of perhaps 5000 years ago, whose most characteristic artifact was stone javelin heads described as similar to, though not identical with, Yuma points, which in turn are the successors of the famous Folsom point, long and still con-

#### COLT GRANTS

The Colt Archaeological Institute will consider during 1951 applications for grants totaling not more than five hundred dollars to one or more projects which promise to further archaeological studies. Grants will be made primarily for archaeological excavation but may also be made for travel, purchase of photographs or drawings, loans of technical equipment, or other expenses incidental to field research or publication.

Applications, stating in precise terms the scope of the project, the expenditures which it is proposed to make from any sum granted, the amount requested, and the professional qualifications of the applicant, may be addressed at any time to the Secretary, Committee on Grants, Colt Archaeological Institute, Room 2500, 63 Wall Street, New York 5, N. Y.

sidered one of the earliest known implements made by human beings in the New World.

At the Garrison Reservoir in North Dakota, a party directed by G. ELLIS BURCAW excavated an earth lodge village, a fortified village of a type peculiar to Indian tribes along the Missouri: Stockades built on packed earth walls, with watchtowers at frequent intervals, encircled by moats. These are very similar to certain fortified villages of mediaeval Europe, but appear to have preceded the first white contacts.

### Catalogue of VISUAL AIDS

for the  
Civilization History Art Archaeology Literature  
of  
EGYPT THE BIBLE LANDS MESOPOTAMIA  
GREECE ROME  
PRE-COLONIAL AMERICA

Compiled by the  
Archaeological Institute of America  
1949

Distributed by the  
AMERICAN CLASSICAL LEAGUE  
Address: Miami University, Oxford, Ohio  
50c

### Overland Odysseys

From Cairo, February 21  
40 days

Cairo and Upper Egypt  
The colorful Arab East  
Arab Palestine, Transjordan,  
Syria, Lebanon  
Rose-red cliff-carved city of Petra  
Old Jerusalem and Bethlehem  
Caravan cities of Jerash, Amman, Palmyra  
Beirut, Baalbek, Damascus, Aleppo  
Greece in the Springtime

As unusual and as intriguing as our former Odyssey Cruises. Limited groups under Odyssey leadership. Comfortable motoring for the most part, with air-jumps to Petra (special camp) and Palmyra to escape the tedium of desert travel.

B. D. MacDonald  
ODYSSEY CRUISES, INC.,  
47 East 47th Street, New York 17, N. Y.  
Murray Hill 8-0185

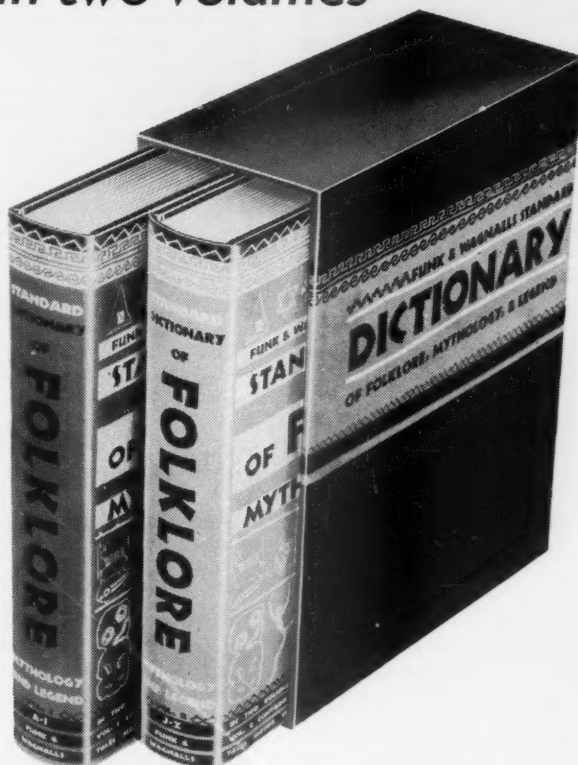


*Now complete in two volumes*

**FUNK &  
WAGNALLS**

**STANDARD  
DICTIONARY  
OF FOLKLORE  
MYTHOLOGY  
AND LEGEND**

*Edited by  
Maria Leach*



**F**OR the first time, the folklore, mythology and legend of the world is gathered in one major, overall survey—the product of 13 years work.

Vol. I (A-I) contains articles and definitions by 30 of the world's foremost folklorists, anthropologists, and comparative religionists on the following cultures:

African and New World Negro—American—Australian—Basque—Celtic—Cheremissian—Chinese—Estonian—European—Finnish—French—Germanic—Indian and Persian—Indonesian—

also articles on acculturation, ballad, dance: folk and primitive, 21 definitions of folklore, folktale, numerous motifs, games, counting-out rimes, as well as gods, heroes, beliefs and practices, childbirth, adultery, burial, etc.

*Second Volume now ready*

Vol. 2 (J-Z) contains articles by the same distinguished list of specialists (plus a few more) on the following cultures:

Japanese—Latvian—Lithuanian—Melanesian—Mexican and Central American Indian—Micronesian—North American Indian—Pennsylvania Dutch—Polynesian—Romany—Semitic—Slavic—South American Indian—Spanish—

also articles on jazz, masks, rattles, ritual drama, mnemonics, primitive and folk art, folk song and the music of folk song, proverbs, riddles, tongue twisters, as well as marriage, phallism, obscenity, virginity, etc.

Volumes may be purchased separately or together—boxed.

Volume I \$7.50

Volume II \$7.50

Two volumes boxed \$15.00

**FUNK & WAGNALLS COMPANY • 153 East 24th Street, New York 10, N. Y.**

## BRIEF NOTICES OF RECENT BOOKS

*The Old Stone Age. A Study of Palaeolithic Times*, by M. C. BURKITT. ix, 254 pages, 30 figures, 8 plates, colored frontispiece. Cambridge University Press, Cambridge 1949 (\$2.75)

It is in fitting recognition of the author's preëminence in the field of Palaeolithic archaeology that a second edition of this comprehensive and clearly-written little book should have been brought out last year by the Cambridge University Press. It is certainly not at all an easy matter to revise a work which in its original form already constituted a compact study of the Old Stone Age written primarily for beginning students and laymen. Nevertheless, when one considers the advances that have been made in our knowledge of this field during recent years—changes in nomenclature, clarification of the Plio/Pleistocene boundary, definition of the Lower Palaeolithic flake industries, recognition of the problems involved in the old Aurignacian complex, the discovery of the Cave of Lascaux—to name a few in Western Europe only, it makes one appreciate all the more the true merits of the first edition that the present version could be produced with so little change. For this reason one should perhaps praise the original work as it was first published in 1933; as the author himself states in his 1949 preface, "the foundations of the subject had been well and truly laid [sixteen years ago] therefore little change has really been necessary." In any case, a conscious effort has been made to bring the book up to date, insofar as possible, without completely rewriting the text. And for the would-be student who wishes to go more deeply into the subject, a select bibliography (pages 243-246) is included.

Chapters III and IV, in which BURKITT discusses the various forms of stone tools and the various methods employed in their manufacture, is one of the really great contributions to this subject available in the English language. But how far afield prehistoric archaeologists in general can go on this score! The fact that we are studying only the imperishable remains of the material culture of small groups of hunting peoples—in many cases living

under the conditions of a rigorous and exacting environment—is very often completely lost sight of. Indeed many workers seem to feel that having arranged their material in an orderly typological fashion, described it on the basis of the accepted terminology, and made appropriate comparisons with analogous assemblages in the same or adjacent regions, the job is done. For those who would carry their research on the problems pertaining to the origin and development of Palaeolithic cultures no further than this point, BURKITT (pages 11-12) cautions that "it is necessary to take into account not only the various industries which occur but also any other factor, such as art, burial customs, etc., which help us to discover anything of the life and minds of the people themselves." Indeed it is the latter which we are studying in the final analysis, and not the details of the flaking technique employed in the manufacture of a given type of stone artifact.

After stressing the importance of the appearance of the Upper Palaeolithic *blade technique* (Chapter IX), and its obvious dissimilarity from the flake industries which preceded it, the author passes on to a consideration of Stone Age art. The four chapters (pages 158-228) devoted to this subject—The Home Art (X), The Cave Art (XI), Motives underlying the Art (XII), and Rock-Shelter Art in Eastern Spain (XIII)—may truly be regarded as the high-water mark of the book. Furthermore, this section constitutes the best statement of the subject as a whole, in all its various ramifications, that has ever been published. In fact this part of the text is so good that one can almost overlook some of the inaccuracies in the book, among which can be enumerated: (a) the general view expounded on pages 106-107 that most present-day workers accept "eoliths" as affording incontestable proof of the existence of Pre-Pleistocene man, (b) the author's failure to extend the limits of distribution of the Acheulian (Fig. 13, page 118) to include the regions bordering the eastern end of the Black Sea, and (c) the statement that the industry associated with *Sinanthropus* at Choukoutien: Locality 1 is "essentially of

the flake, not core, variety" (Footnote 1, page 19) when in point of fact choppers and chopping-tools made on pebbles (core tools) abound at the site. But, since the book only contains 242 pages of text and is primarily intended to present a summary of the classic West European sequence, it is perhaps asking too much of the author to attempt to cover the Palaeolithic cultures of the entire Old World. Some day it is hoped that the latter will be attempted.

In the meantime, Burkitt's second edition of "The Old Stone Age" is to be regarded as the best and most up-to-date general work on the subject that is available for use by English-speaking first-year students of Palaeolithic archaeology. The Cambridge University Press is to be congratulated for publishing it, and for the excellence of its format.

HALLAM L. MOVIUS, JR.

Peabody Museum, Harvard University

*Vom Verhältnis der Römer zur Bildenden Kunst der Griechen*, by Hans Jucker. 185 pages. Klostermann, Frankfurt am Main 1950 12.50 DM.

The Germans are certainly making a "come-back" in scholarship and publications. Here is a learned and excellent book, which is practically a dissertation presented at the University of Zürich in 1946. It is an important monograph, despite the lack of illustrations and the many misprints, on the use which the Romans made of Greek Art. It is documented in detail with countless references to ancient and modern literature; one of the best books on the subject. It should be translated into English and made available to every teacher of Latin, Art, and Ancient History. As Vergil in *Aeneid* 6. 847 ff. says, the Romans must go to the Greeks for their bronze and marble statues, while they give their attention to ruling and establishing peace and putting down the proud:

excedunt alii spirantia mollius aera,  
credo equidem, vivos ducent de marmore vultus.

This is a statement which has often been forgotten, but Professor JUCKER

gives all the evidence, archaeological and literary. He cites most of the cases where the Romans carried off thousands of statues from Greece. He shows also how the Romans imitated many other Greek works of art; museums and collections of art in Rome such as the elaborate one of Asinius Pollio had sculptures of Praxiteles, Cephisodotus, Papyllus, Scopas, Eutychides, Tauriscus, Apollonius, Arcesilaus, Stephanus, Cleomenes, etc. (page 69). Professor JUCKER knows the literature well, even such American books as HANSEN, *The Attalids of Pergamon*, which, however, has no knowledge of SCHWEITZER's very important book on *Xenokrates von Athen*, much used by JUCKER. He does not cite F. P. JOHNSON's *Lysippus*, said by POULSEN to be the best work about Lysippus. He does not mention the painter of pictures such as the Pyramus and Thisbe in the recently excavated and recently somewhat damaged house of Loreius Tiburtinus at Pompeii (LVCIVS PINXIT in the inscription).

DAVID M. ROBINSON  
University of Mississippi

*The Lost Province or the Worth of Britain*, by M. P. CHARLESWORTH. viii, 89 pages. University of Wales Press, Cardiff 1949 £s. 6d.

This charmingly printed little book reproduces the four Gregynog Lectures, which Mr. CHARLESWORTH, who certainly does not need an introduction here, delivered in 1948.

Each lecture sets out to elucidate a reason or reasons for Roman policies or actions affecting ancient Britain. And so, in the first lecture (The years of conquest, pages 1-17), Mr. CHARLESWORTH explains the reasons for the Roman conquest of the island and to those already well known he adds a new one. Due to a curious and mistaken notion that Ireland was situated between Britain and Spain the Romans believed that the occupation of Britain "would help (them) to link together the strongest provinces of the Empire (6)" and so create "an Atlantic lake" controlled by Rome (41)."

The second lecture (Romans and Britons, pages 18-40) examines the relations between conqueror and conquered and briefly touches upon the

reasons why some prudent emperors made every effort to retain the island. Here the lecturer offers an interesting suggestion that Magnus Maximus turned the Votadini and Damnonii into friends and allies by giving them the status of foederati and, by doing so, provided for the defense of the northern frontier before he left Britain.

The purpose of the first two lectures was to offer the audience a general historical background up to 450 A.D., after which date (if not before) every vestige of Roman authority ceased to exist in Britain. Now, in the third lecture (pages 41-63), the lecturer takes up the topic "What Rome gained from Britain" and examines the consideration that prompted the Romans to cling tenaciously and for centuries to the island, though they relinquished and sacrificed territory in other parts of the Empire. Originally (not to mention prestige) they were influenced by political and strategic considerations. Soon, however, Britain became a source of manpower and a reservoir of armed force, capable of reinforcing weak places, in other words a "defense re-

## YALE

### *Good News for Greek Scholars . . .*

A new and revised edition of this definitive work

### **THE SCULPTURE AND SCULPTORS OF THE GREEKS**

by Gisela M. A. Richter. *Curator of the Department of Classical Art at New York's Metropolitan Museum of Art from 1925 to 1948*

Greek scholars will welcome this new and revised edition, which was greeted upon its original publication with such critical acclaim as this:

"Miss Richter has undertaken to present an analysis of Greek sculpture which shall make clear the technical and aesthetic problems confronting the artist, and the steps by which those problems were mastered. Her success is so conspicuous that it is hard to speak of it with restraint."

No mere textbook and factual history of art, nor a subjective appreciation, *The Sculpture and Sculptors of the Greeks* is an exquisite balance of informative detail and thoughtful interpretation, whereby the author proves herself both artist and scholar. \$15.00

at your bookseller

**YALE UNIVERSITY PRESS**

New Haven 7, Connecticut

serve (17, 42)" and a "strategic reserve (44)." After 150 A.D., because of the gradual increase in British productivity and the exploitation of her various mineral resources, the island became also a source of skilled manpower that could be employed in other parts of the Empire. The Romans clung to Britain because the island "was indeed a wealthy island" (62) and because from the military and economic point of view Britain made a substantial contribution to the Empire's wealth.

"What we have gained from the Roman occupation," is the title of the fourth and last lecture (pages 64-82). The first gain was unity, a bond which was strengthened by language, culture, communications, religion and art. "That is what we have inherited from the Roman occupation of Britain, however much some earlier historians failed (or refused) to recognize it" (64). Interesting are Mr. CHARLESWORTH's remarks on the Romans, whom he defends against the charge of hardheadedness (71). They do not receive the credit due them for introducing to Britain a civilized mode of living by furthering various arts and crafts and by transplanting, to quote only one example, many varieties of flowers (among them pansies and violets), fruits, vegetables and trees (walnut, sweet chestnut and others). Let me now quote the conclusion (82):

From that mainland (the Continent) we derive, ultimately, most of the things that have made our life and culture, however much we have moulded them and fashioned them to something of which we may rightly boast, and the Roman occupation was the first, and certainly not the least, of those vital sources, the first achievement of a British unity.

The volume is equipped with two maps and a bibliography (pages 83-87) which is useful, though it does not aim at completeness. Here I miss the mention of the important work of F. MASAI, *Essai sur les origines de la miniature dite Irlandaise* (Antwerp 1948), in connection with the lecturer's statement on p. 77 on teaching the Irish art of illuminating manuscripts. An index would have increased the value of the volume. Generally speaking Mr. CHARLESWORTH's contribution is a successful and stimulating blend of popu-

larization and scholarship and as such it ought to appeal to classicists and non-classicists alike. The latter in particular will become more than aware of the fact that the world we are living in is in many respects a continuation of the Roman world.

J. HAMMER

Hunter College

Colonial Architecture and Sculpture in Peru, by HAROLD EDWIN WETHEY. xvii, 330 pages, 1 + 366 illustrations, end-paper map. Harvard University Press, Cambridge 1949 \$12.50

This is both a scholarly book for the specialist in the history of architecture or the historian of colonial South America and a book of absorbing interest to the layman whose interest in these subjects is more avocational. Its aim is to present a general survey of Peruvian colonial monuments, arranged geographically according to centers of artistic production, with chronological developments stressed within the geographical division; the two chief centers are Lima and Cuzco, the latter now sadly depleted since the earthquake of last spring. The author states several times that much still remains to be done, that volumes may be written when further research is accomplished on subjects that he treats in short chapters. Yet he has achieved much more than a general survey; he has written the definitive work on Peruvian colonial art, charted the main courses of architectural and sculptural accomplishments, and set the standards for all future scholars in this field.

His scholarship is an exacting one and bears witness to an extraordinarily alert activity during his two years in Peru in 1945 and 1946 and further research during the subsequent years. Already expert in the history of Spanish architecture and allied arts, he has unravelled the confusion of Spanish colonial art in Peru with a discerning eye and sensitive mind. He carefully

distinguishes the results of purely Spanish activity from that which is mingled with autochthonous strains of Incan elements, producing the fascinating *mezitizo* style. He traces many elements to Andalusian Spain, particularly to Seville, and on the other hand brings to light native designers, especially the gifted TUPAC, an Indian who had much to do with Cuzco's church of San Pedro.

Two thirds of the book are given over to architecture, mostly churches, but with attention to significant private houses and civil structures. The rest of the book is an equally important study of sculptured works, arranged according to types: choir stalls (those of seventeenth and eighteenth century Lima and Cuzco have never been studied before), pulpits, retables and figure sculpture. A surprising wealth of material is shown, and the richness of decorative art in Peru strikes the reader with force. The excellent illustrations are an important part of the book. One might wish they were interleaved with the text, for easier reference, and although there are hundreds one might wish for one more, a reproduction of the original seventeenth century drawing for the high altar of Sucre Cathedral, which the author discovered, of importance because the altar marked the turn from the Renaissance to the Baroque, and was long ago destroyed.

The book is written in a pleasant readable style with enthusiasm for the subject and plenty of instances of the writer's individuality emerging. He has sharp words to say for the designers of the neo-classic school of the nineteenth century, even more scathing ones for the renovators and "restorers" of the twentieth, and a trenchant remark or two aimed at those whose jaded palates lead them to attach too much worth to primitive native sculpture dressed in the clothes of local Indians. The scholarly character of the book is aided by an extensive and valuable bibliography, a series of footnotes placed separately where they do not intrude upon the non-scholarly, and by generous and gracious acknowledgments to those in both hemispheres who have helped the author in bringing to completion this truly monumental work.

RICHARD H. HOWLAND

The Johns Hopkins University

#### THE ARCHAEOLOGIST'S EPITAPH

You need not dig for works of art,  
There's nothing here to see;  
Just take a squeeze, and then depart,  
And leave my grave to me.

—D. H.



## NEW BOOKS

Selected at the editorial offices from various sources, including bibliographical publications, publishers' announcements, and books received. Prices have not been confirmed.

BALL, SYDNEY H. A Roman book on precious stones, including an English modernization of the thirty-seventh booke of the *Historie of the World* by C. Plinius Secundus. 350 pages. Gemological Institute of America, Los Angeles 1950 \$6.75

BOLLING, GEORGE MELVILLE, Ed. *Ilias Atheniensium: The Athenian Iliad of the Sixth Century B.C.* x, 514 pages. American Philological Association, New York 1950 \$5.00

CAPART, J., F. CHAPOUTHIER, W. DEONNA, and others. *Manuel de la technique des fouilles archéologiques.* 235 pages, ill. Office des éditions universitaires, Paris 1950 1750 fr.

CAVAIGNAC, EUGÈNE. *Les Hittites.* 125 pages, ill. Maisonneuve, Paris 1950 250 fr.

CHRMES, K. M. T. *Ancient Sparta. A reexamination of the evidence.* 527 pages, ill., map. Manchester University Press, Manchester 1950 45s.

DANIEL, GLYN E. *The Prehistoric Chamber Tombs of England and Wales.* xiv, 256 pages, 33 figures, 16 plates. Cambridge University Press, Cambridge 1950 \$6.50

DESAI, MADHURI. *India (Bharat). Architectural and Sculptural Monuments with approximate dates of different periods in Indian art.* Map 97 x 65 cm. Designed and prepared by M. D. BERNE, Legation of India 1950 10 S.fr.

DRAKIN, I. E., Editor and translator. *Caelius Aurelianus: On Acute Diseases and on Chronic Diseases.* 1216 pages. University of Chicago Press, Chicago 1950 \$15.00

ELKIN, A. P., and RONALD and CATHERINE BERNDT. *Art in Arnhem Land.* 144 pages, 24 figures, 9 color plates, map. University of Chicago Press, Chicago 1950 \$7.00

FOX, SIR CYRIL, and BRUCE DICKINS, Eds. *The early cultures of North-West Europe.* xvi, 442 pages, ill. Cambridge University Press, Cambridge 1950 £3 3s

FREE, JOSEPH P. *Archaeology and Bible History.* 416 pages, ill., maps, diagr. Van Kampen Press, Wheaton 1950

GEBHART, HANS. *Numismatik und Geldgeschichte.* 115 pages. Winter, Heidelberg 1949 4.50 M.

GIFFORD, E. W. *Surface archaeology of Ixtlan del Rio, Nayarit.* 126 pages, ill., maps, diagrs. University of California Press, Berkeley 1950 (Univ. of Cal. pubns. in American archaeology and ethnology, Vol. 43, no. 2) \$2.25

GRAND, ROGER. *L'agriculture à travers les âges. Vol. III, L'agriculture au moyen âge, de la fin de l'empire romain au XVI<sup>e</sup> siècle.* 750 pages. E. de Boccard, Paris 1950 1800 fr.

GRANT, MICHAEL. *Roman Anniversary Issues. An exploratory study of the numismatic and medallic commemoration of anniversary years 49 B.C.—A.D. 375.* xxiv, 204 pages, 2 plates. Cambridge University Press, Cambridge 1950 (\$4.50)

GRENE, DAVID. *Man in his Pride: A study in the Political Philosophy of Thucydides and Plato.* 256 pages. University of Chicago Press, Chicago 1950 \$4.00

HAURY, EMIL W., and others. *The Stratigraphy and Archaeology of Ventana Cave, Arizona.* 599 pages, illustrated. University of Arizona Press, Tucson, and University of New Mexico Press, Albuquerque 1950 \$15.00

HUBERT, HENRI. *Les celtes et l'expansion celtique jusqu'à l'époque de la Tène.* 436 pages, ill., maps. Albin Michel, Paris 1950 900 fr.

HUBERT, HENRI. *Les celtes depuis l'époque de la Tène et la civilisation celtique.* Albin Michel, Paris 1950

JASHEMSKI, WILHELMINA FEEMSTER. *The Origins and History*

of the Proconsular and the Proprætorian Imperium to 27 B.C. 184 pages. University of Chicago Press, Chicago 1950 \$5.00

JOHN, WALTHER. *Die Örtlichkeit der Varusschlacht bei Tacitus. Eine Quellenunters.* 30 pages. Musterschmidt, Göttingen 1950 1.50 M.

KAR, CHINTAMONI. *Classical Indian Sculpture, 300 B.C. to A.D. 500.* vii, 38 pages, 86 figures, map. Alec Tiranti, London 1950 6s.

KENDRICK, THOMAS DOWNING. *Late Saxon and Viking art.* 263 pages, ill. Methuen, London 1950 (\$6.75)

KUBLER, KARL. *Altattische Malerei.* 84 pages, ill. Wasmuth, Tübingen 1950 14 M.

MACALISTER, ROBERT ALEXANDER STEWART. *The Archaeology of Ireland. New edition.* 406 pages, ill., diagrs. Methuen, London 1950 (\$6.75)

MATZ, FRIEDRICH. *Geschichte der griechischen Künste. Vol. 1. Die geometrische u. d. früharchaische Form.* Flostermann, Frankfurt 1950 7.50 M.

MAY, J. M. F. *Ainos: Its history and coinage, 474-341 B.C.* x, 288 pages, ill. Oxford University Press, Oxford 1950 25s.

MILNE, J. G., C. H. V. SUTHERLAND, and J. D. A. THOMPSON. *Coin Collecting.* xiii, 152 pages, 44 plates. Oxford University Press, London 1950 (\$2.00)

MURRAY, GILBERT, Tr. *The Birds of Aristophanes.* 184 pages. Oxford University Press, New York 1950 \$2.50

NEWCOMB, REXFORD. *Architecture of the Old Northwest Territory. A Study of Early Architecture in Ohio, Indiana, Illinois, Michigan, Wisconsin, and part of Minnesota.* 278 pages, 249 photographs. University of Chicago Press, Chicago 1950 \$20.00

PARKER, RICHARD A. *The Calendars of Ancient Egypt.* 112 pages, ill. University of Chicago Press, Chicago 1950 (Studies in Ancient Oriental Civilizations, No. 26) \$6.00

PEDRALS, DENIS PIERRE DE. *Archéologie de l'Afrique noire.* 240 pages, ill. Paris 1950 500 fr.

QUENEDY, COMMANDANT R. *La prison de Jeanne d'Arc à Rouen, études historiques et archéologiques.* 135 pages. Honoré Champion, Paris 1950 150 fr.

SANDERMAN, CHRISTOPHER. *A wanderer in Inca land.* 192 pages, ill., map. Scribner, New York 1950 \$12.50

SCHNEIDER, ALFONS MARIA. *Die Kuppelmosaiken der Hagia Sophia zu Konstantinopel.* 345 pages, ill. Vandenhoeck and Rupprecht, Göttingen 1949 13 M.

SCHWARTZ, EDUARD. *Charakterköpfe aus der Antike.* Edited by JOHANNES STROUT. 3rd revised edition. 299 pages. Koehler and Ameland, Leipzig 1950 6 M.

SJOESTEDT, MARIE-LOUISE. *Gods and heroes of the Celts, tr. by MYLES DILLON.* Methuen, London 1950 (\$2.25)

SWANN, NANCY LEE. *Food and money in ancient China.* xiv, 482 pages, ill. Oxford University Press, Oxford 1950 63s.

TROREY, LYLE G. *Handbook of aerial mapping and photogrammetry; foreword by W. W. WILLIAMS.* 194 pages, ill., maps. Cambridge University Press, New York 1950 \$5.00

VOLAVKOVA, HANA. *The synagogue treasures of Bohemia and Moravia.* 154 pages, ill. George Efron, New York 1950 \$5.00

WALDSCHMIDT, ERNST, and others. *Geschichte Asiens.* 767 pages. Bruckmann, München 1950 24 M.

WEICKERT, CARL. *Studien zur Kunstgeschichte des 5. Jahrhunderts v. Chr.: 1. Polygnotos.* 28 pages. Akademie Verlag, Berlin 1950 (28s.)

WINDELS, FERNAND. *The Lascaux Cave Paintings.* 139 pages, illustrated. Viking Press, New York 1950 \$10.00

WOTSCHITZKY, ALFONS. *Das antike Rom.* 104 pages, ill. F. Rauch, Innsbruck 1950 18.60 M.

## TABLE OF CONTENTS

Acropolis by Floodlamp, The.....	223
ALEXANDER, MARGARET A.: The Symbolism of Christianity.....	242
ANGEL, J. LAWRENCE: Skeletons.....	233
Anonymous: Noctes Hellenicae.....	53
APPEL, JACK IRWIN: Archaeological Postage Stamps from Latin America.....	179
APPEL, JACK IRWIN: Archaeological Scenes on Postage Stamps.....	38
Archaeological News.....	57, 120, 184, 249
BELLINGER, ALFRED R.: The Gold Coins of Justinian II.....	107
Brief Notices of Recent Books.....	61, 124, 188, 252
BRÖNDSTED, JOHANNES: Bronze Age Clothing Preserved in Danish Graves.....	16
Djemila-Caicul, Roman Resort in North Africa.....	98
DORESSE, JEAN: A Gnostic Library from Upper Egypt.....	69
DUNHAM, DOWS: The Status of Excavating in Egypt and the Sudan.....	2
Dura Air Photographs, The.....	158
ECKELS, CLAIRE WITTLER: The Egyptian Revival in America.....	164
Editorial: Survival of the Fittest.....	130
ELDER, JOHN PETERSEN: Early Type Faces.....	142
EVANS, JOAN: Sir Arthur Evans and Knossos.....	134
FITZPATRICK, MARY C.: The Post-War Exploration of Veii.....	22
FORBES, EDWARD W.: Thomas Whittemore, 1871-1950.....	180
FORSYTH, GEORGE H., JR.: "Geometricis et Aritmeticis Instrumentis".....	74
FORSYTH, WILLIAM H.: The Virgin of Saint-Martin.....	80
FRANTZ, ALISON: Truth Before Beauty, or, the Incomplete Photographer.....	202
GODFREY, WILLIAM S., JR.: Newport Tower II.....	82
HEALEY, GILES GREVILLE: The Lacanja Valley.....	12
HETTICH, ERNEST L.: The Colt Papyrus Find from Auja.....	31
HILL, DOROTHY KENT: Animals in Your Museum.....	96
HILL, DOROTHY KENT: Middle-Kingdom Egypt.....	248
HOLLAND, LOUISE ADAMS and LEICESTER BODINE: Down the Tiber on a Raft.....	87
JENNINGS, JESSE D.: Table Top Archaeology.....	175
KELSO, JAMES L.: The Palestine Archaeological Museum.....	66
MANGO, CYRIL A.: The Funeral Tree.....	140
MASON, J. ALDEN: Ye Gods and Little Fishes.....	95
MAURER, JOSEPH A., and HANS-KARL SCHUCHARD: Moravian Buildings in Bethlehem.....	226
NEEDLER, WINIFRED: A Hathor from Eleventh-Dynasty Egypt.....	194
New Books.....	64, 128, 192, 255
PICARD, CHARLES: The Romans in Paris.....	112
PIGGOTT, STUART: The Prehistoric Society.....	119
POHL, FREDERICK J.: The Newport Tower: An Answer to Mr. Godfrey.....	183
REIFENBERG, A.: Archaeological Discoveries by Air Photography in Israel.....	40
RICHARDS, HORACE G.: The Iron Age Village at Biscupin.....	170
ROSS, MARVIN C.: A Second Byzantine Silver Treasure from Hamah.....	162
SATTERTHWAITE, LINTON: Plastic Art on a Maya Palace.....	215
SCHUCHARD, HANS-KARL, and JOSEPH A. MAURER: Moravian Buildings in Bethlehem.....	226
SCRANTON, ROBERT L.: Greek Arts in Greek Defenses.....	4
THOMPSON, DOROTHY BURR: Figures in Fun.....	132
THOMPSON, DOROTHY BURR: Parks and Gardens of the Ancient Empires.....	101
THOMPSON, HOMER A.: Agrippa's Concert Hall in the Athenian Agora.....	155
THOMPSON, MARGARET: The "Owls" of Athens.....	151
TSCHAN, FRANCIS J.: Early Eleventh Century Bronze Casting.....	47
VANDERPOOL, EUGENE: The Apostle Paul in Athens.....	34
WARD-PERKINS, J. B.: Gasr es-Suq el-Oti, a Desert Settlement in Central Tripolitania.....	25
YOUNG, RODNEY S.: The Excavations at Yassihuyuk-Gordion, 1950.....	196

# ARCHAEOLOGICAL INSTITUTE OF AMERICA

Atlanta  
Baltimore  
Boston  
Chicago  
Cincinnati  
Cleveland  
Detroit  
Greensboro  
Hartford  
Iowa  
Lehigh Valley  
Lynchburg  
Madison  
Memphis  
Minnesota  
New Haven  
New York  
North Carolina  
Oberlin  
Oxford, Mississippi  
Oxford, Ohio  
Philadelphia  
Pittsburgh  
Princeton  
Providence  
Richmond  
Rochester  
St. Louis  
San Francisco  
Santa Fe  
Southern California  
Spokane  
Springfield, Ohio  
Toronto  
Walla Walla  
Washington, D. C.  
Western Massachusetts

## PUBLICATIONS

*American Journal of Archaeology*  
*Archaeology*  
*Archaeological Newsletter*  
*Bulletin*  
*Monographs*

## SOCIETIES

There are now thirty-seven local Societies of the Institute, listed at the left. Members are invited to attend the lecture meetings of the local Society most convenient to their residence.

## MEMBERSHIP—ANNUAL DUES

SUSTAINING . . . . .	\$15.00
ANNUAL . . . . .	\$10.00
STUDENT . . . . .	\$ 5.00

Sustaining Members receive all periodicals published by the Institute; Annual and Student Members receive the *Newsletter* and the *Bulletin*, and their choice of *ARCHAEOLOGY* or the *AMERICAN JOURNAL OF ARCHAEOLOGY*.

## INFORMATION

For Membership applications, specimen copies of magazines, or any other information concerning the Institute and its activities, write

THE GENERAL SECRETARY,  
ARCHAEOLOGICAL INSTITUTE OF AMERICA,  
ANDOVER HALL,  
CAMBRIDGE 38, MASSACHUSETTS.



*Princeton* UNIVERSITY PRESS

## **THE DOME**

**A Study in the History of Ideas**

*By E. Baldwin Smith*

LITERARY sources, numismatics, and the beginnings of religious concepts are examined in this study of the evolution of the dome, in order to show how and why the dome became a form of transcending importance to the people who made it a celestial symbol. The author is chairman of the Department of Art and Archaeology at Princeton. No. 25, *Princeton Monographs in Art and Archaeology*. \$7.50

## **ATLAS OF ISLAMIC HISTORY**

*By H. W. Hazard and H. L. Cooke*

THIS handsome atlas contains 21 full-color maps, a gazetteer, and a record of Islamic history from the 7th to 20th centuries. It fills a long-felt need of students of the Near and Middle East, historians of medieval Europe, the Mediterranean world, and the Moslem Far East. No. 11, *Princeton Oriental Studies*. \$4.00

AT YOUR BOOKSTORE



PRINCETON UNIVERSITY PRESS



